May 1980

LIQUEFIED GAS SHIP SAFETY
Analysis of the Record 1964 - 1979

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Summary

How dangerous is the marine transportation of liquefied gases?
From time to time concern is expressed over the possible hazards of LNG and LPG shipping. Disaster scenarios have been envisioned whereby a vessel mishap could escalate into an accident of catastrophic proportions. Even though such an occurence is highly unlikely, it is argued that the potential damage might be unacceptably great.

Nevertheless, it should be kept in mind that these are imaginary marine disasters. A large body of historical data exists on the actual safety performance of liquefied gas ships. The information dates back to 1964 when the data was initially compiled. To the best of our knowledge, every significant gas ship accident over the past sixteen years has been recorded. We believe that a careful examination of these past records can provide the best possible guidance as to what could go wrong in the future.

LNG and LPG are both flammable when mixed with air. Thus accidents which result in cargo spill or leakage, or in cargo fire, are potentially the most dangerous. Our analysis indicates only two incidents of cargo spill, neither of which resulted in serious consequences, and no case of cargo fire. These results hold true for 1979, as for preceding years (1964-78). Additionally, we find that the safety record for gas ships is apparently superior to that of crude oil tankers over an equivalent period.

Overview

This report is an update of POTEN AND PARTNER's previous studies on Liquefied Gas Ship Safety, published in 1978 and 1979.

As before, casualty data on gas ships have been compiled from reports published in Lloyd's List. The data originate in notifications by ship-owners to insurance underwriters of potential damage claims. It is believed that all incidents resulting in serious damages or hazard have been recorded, as owners have every reason to report what might be major losses to their insurance carriers. A complete listing of casualties over the period 1964-1979 is to be found in the Appendix attached to this report.

Incidents which are judged "serious" are those where there was some actual or potential threat to the cargo containment system. Any spill or leakage of cargo creates a possibility of fire which could endanger nearby persons or property.

The three questions to ask about any incident are these:

1) Could the accident have resulted in cargo leakage; was there a risk of leakage?

2) Did some leakage of cargo in fact occur?

3) Did the spill ignite and cause fire damage?

The first question involves human judgement in identifying "serious incidents". The criteria used in this study has been to consider as "serious":

1) All incidents of fire or explosion occuring anywhere on a gas ship.

2) Incidents of hull damage resulting from groundings, collisions with another ship, contact with stationary objects, and being struck while moored. (Not included were incidents when the cargo tanks were empty and gas-freed or filled with non-flammable cargo).

3) All incidents of cargo spill or leakage.

Data relating to the consequences of accidents are much less judgmental. Casualty reports are quite clear as to whether cargo leakage occured and whether a cargo fire resulted. This portion of the data is believed to be accurate and complete.

The report findings, for LNG ships and other gas (LPG) ships separately, and the comparative safety record, are presented in the sections following.

The Safety Record - LNG Ships

LNG cargo is transported at or near atmospheric pressure at temperatures of minus 165 degrees centigrades. The cargo tanks are made from materials which retain their ductility in this environment. They must be insulated to protect the hull structure and to control the rate of cargo vaporization (which is utilized as ship fuel).

No LNG vessel has been placed in service until after it has passed exhaustive tests on hull structure, cargo containment and vessel performance at the shipyard and during sea-trials carrying LNG cargo.

The first regular shipment of LNG began in 1964. Between 1964 and 1979 the operating LNG fleet has delivered approximately 5,200 LNG cargos. The number of vessels classified to carry LNG totals 54. Of these, 46 have actually transported an LNG cargo, and one vessel has been retired from active service.

This survey has identified seven serious incidents over sixteen years where, in the judgement of POTEN AND PARTNERS INC., some risk of cargo leakage or fire appeared to exist. The serious incidents and their consequences are summarized below:

Summary of serious incidents (LNG ships)

Type of Incident	Number of incidents 1979	1964-1979	Cargo leakage	Cargo Fire
Collision while underway	0	1	0	0
Struck while moored	0	1	0	0
Contact with stationary object	0	0	0	0
Grounding	1 (a)	1	0	0
Explosion/fire on board	2	3	0	0
Spillage of cargo	1	1	1 (b)	0
T O T A L S	4	7	1	0

(a) The EL PASO PAUL KAYSER hit a submerged rock on June 29, 1979, in the Straits of Gibraltar. Approximately 850 tons of steel were ripped out of the hull bottom and twelve bottom and wing tanks, duck keel and forward pump room were exposed to the sea. The cargo containment system however, remained intact. On July 4, the vessel was refloated and towed 2-1/2 miles to the Bay of Algerciras where all cargo was transferred, seven days later, to the El PASO SONATRACH.

(b) The MOSTAFA BEN BOULAID had an LNG spill of 15 minutes' duration while discharging cargo at Cove Point, Maryland on April 8, 1979. Leakage resulted from a construction defect of a safety valve. The damage was limited to deck fractures. There was no cargo tank damage. Repairs were subsequently made at yard and vessel has since traded without incident.

The record indicates that in no instance was a tank damaged so that cargo escaped. No case of cargo fire is to be found.

LNG in the liquefied state will not burn. First it must be warmed and vaporized, and then mixed with air before it can ignite. In the event of an accidental spill, this delay could allow time to prevent ignition and disperse the vapor. For this reason, an LNG spill might be less likely to burn than a gasoline spill. The historical record gives no guidance on this point since no serious spill has ever occured.

The Safety Record - LPG Ships

LPG has been carried in ships since 1934, originally in pressure bottles at normal ambient temperatures, but by the late 1950's, at reduced temperatures and pressures. The fleet now in service consists of pressure only, pressure and refrigerated combined (semi-refrigerated), and fully refrigerated designs. In addition to LPG (propane and butane), many of the ships can carry a range of cargos such as anhydrous ammonia, propylene and butylene, butadiene and vinyl chloride monomer. All of these gases are characterized by being heavier than air at normal temperatures, and by being flammable when mixed with air.

Since 1964, the number of LPG ships in service (over 5000 cubic meters) has totalled 152. Of these, 147 are currently operational, four have been scrapped or retired and one has been deliberately sunk (see below). The fleet has delivered approximately 19,000 cargos of LPG or other liquefied gases.

There have been 37 serious incidents to this fleet over this timespan where, in the judgement of POTEN AND PARTNERS, INC., some risk of cargo leakage or fire appeared to exist. The serious incidents and their consequences are summarized as follows:

Summary of serious incidents (LPG ships)

Type of incident	Number of Incidents 1979	1964-1979	Cargo Leakage	Cargo Fire
Collision while underway	1	10	0	0 (a)
Struck while moored	0	5	0	0
Contact with stationary object	2	4	0	0
Grounding	2	8	0	0
Explosion/Fire on board	0	9	0	0 (b)
Spillage of Cargo	0	1	1 (c)	0
T O T A L S	5	37	1	0

(a) The YUYO MARU NO. 10 incident is a special case. The vessel, a composite ship carrying naphtha and LPG, was rammed and set afire in Tokyo Bay on November 9, 1974. The naphtha tanks ruptured in the collision, and the naphtha ignited. The fire burnt for several days before the ship was deliberately sunk. Despite the conflagration, it appears that the LPG tanks may have remained intact.

(b) The DANIAN GAS, while discharging propane at Donges on October 10, 1978, suffered a pump failure. Pump internals seized and overheated. A small amount of cargo was involved in the resulting localised fire, but damage was minimal.

(c) The LAVOISIER suffered a cargo leak while discharging butane at Bordeaux on March 23, 1967. A fracture in the safety valve may have been responsible. The cargo did not ignite.

As with LNG ships, no instance has been found of a cargo spill resulting from hull or tank damage. Equally, no case of LPG cargo fire is to be found.

Gas Ships - The Comparative Record

No definitive judgement can be made as to whether gas ships are safer or less safe than other ships carrying liquid fuels.

A comparative analysis of casualties was completed in 1979 by the Inter-Governmental Maritime Consultative Organization (IMCO). The results, as shown below, appeared to indicate a lower annual casualty record for gas ships than for oil tankers.

Apparent Serious Casualty Rate (1968-77)*

	Oil Tankers (over 10,000 DWT)	Gas Ships (over 10,000 CBM)
Fleet - number of vessels	3,572	120
Fleet - number of ship-years	32,695	696
Serious Casualties	753	5
Casualty Rate (per 100 ships at risk)	2.30	0.73

Source: IMCO, Tanker Casualties Report-Analysis of Ocean-going Tankers 1968-77, London, 1978

Design requirements for gas ships, as codified by the U.S. CoastGuard and the Inter-Maritime Consultative Organization, are commensurately stricter than those for oil tankers. For instance, typical gas ships are constructed with double bottoms and double side-shells to minimize the impact on cargo tanks in the event of accidents. Cargo tanks themselves must be located at specified minimum distances inboard from the ship's shell plating. The tanks are always sealed. During loading and discharge operations, gas is returned to the ship to replace the volume of liquid that is discharged(or vice-versa if loading), thus precluding the possibility of air entering the tanks at any time.

*IMCO's assessment of serious casualties is not necessarily identical to that of Poten and Partners. Individual judgements will vary on a case-by-case analysis.

These built-in safeguards may have played a role in preventing any serious consequences of accidents happening to gas ships. The IMCO data identify 99 incidents of cargo fires to oil tankers over the period 1968-1977. If that rate of incidence were translated proportionately to the gas fleet over the equivalent period, one would have expected at least two cargo fires to have occurred. Although not statistically significant, the historical record does indicate no instance of cargo fire.

A third factor to be remembered is that the total gas fleet is younger than the corresponding oil tanker fleet.

Comparative Age of Fleet

Vessels - Per cent of Fleet	Less than 3 years old	Less than 8 years old	Less than 13 yrs. old
Tankers*	16%	50%	68%
Gas Ships - LPG	34%	59%	88%
Gas Ships - LNG	38%	79%	94%

* Source: H. Clarkson & Co., Ltd., The Tanker Register, 1979

There is no conclusive evidence which shows that the rate of serious casualties increases with the age of the ship. But one might intuitively expect newer ships, built to later standards and specifications and less subject to wear and tear, to perform better and with fewer problems while in service.

None of this proves that gas ships are intrinsically safe, nor even that they are safer than oil tankers. LNG and LPG may be hazardous cargos, yet the record clearly shows that they have been handled safely in the past. History does not tell us that a major accident cannot occur, only that it need not occur. The standards of crew training and of ship construction being continually raised, there is every reason to expect past levels of safety to be maintained or even surpassed.

APPENDIX

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

THE HISTORICAL RECORD (1964-1979)

This is a compilation of all reported casualties sustained by liquefied gas carriers (larger than 5000 cubic meters cargo capacity) during the 16-year period from 1964 to 1979. Every effort has been made to include all casualties reported and each ship that was in service during this period. Data were compiled on a total of 206 ships and 293 reported casualties of all types. Unmanned barges were excluded.

Cargo Tank Type	Ships	Casualties
I - Insulated for LNG	54	58
R - Refrigerated	111	195
S - Semi-Refrigerated	39	39
P - Pressurized	2	1
TOTAL	206	293

Casualties included in this report were obtained from LLOYD's LIST, the daily newspaper published by Lloyd's of London Press.

Casualty data compiled for this study was prepared by The Tanker Advisory Center of New York, which does not guarantee the accuracy of the information provided, and does not accept responsibility for errors or omissions or their consequences.

The information contained herein originated in preliminary reports of potential insurance claims. It is believed that all or virtually all casualties involving substantial damages were reported and are included here.

In the case of minor incidents where no damage was immediately apparent, reporting practices by shipowners have varied. Some owners, and the fleets of certain nations, tend to self-insure, and thus do not report such incidents. On the other hand, the fleets of certain nations (such as Britain), which traditionally have had close reporting relationships with Lloyd's, are likely to be over-represented. Thus a simple head-count of casualties by vessel is not considered to be very meaningful. The number of casualties shown does not necessarily give an indication of the quality of the ship nor of shipboard operation.

The preliminary casualty reports have no official status and were not submitted to any governmental agency. In many cases, detailed information on

the cause or consequences of a casualty was not available at the time a report was filed. The wording of the reports should not be construed as fixing blame or responsibility for any casualty, for such determination had not been made at the time of reporting.

LIQUEFIED GAS SHIPS

(INDEX OF VESSELS OVER 5,000 CBM)

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-79)	Reference Page No.
AEGIS DILIGENCE (constructive total loss 1975)	R	7	8	1
AL BERRI	R	0	0	
AL BIDA	R	0	0	
AMVROSIOS	R	5	0	
ANTILLA BAY	R	6	2*	2
ANTILLA CAPE	R	11	1	3
ARCTIC TOKYO	I	10	1	3
ARISTOTLE (retired from trading 1975)	I	14	9	4
ATLANTE (ex PROVIDENCE MULTINA)	R	6	2*	6
BEAVA (scrapped 1974)	R	12	1	6
BEN FRANKLIN	I	4	2*	7
BENGHAZI	S	1	0	
BERGA (ex PASCAL)	S	12	2	8
BERGE SAGA	R	0	0	
BERGE SISAR	R	0	0	
BERGE SISU	R	1	0	
BERNARDO HOUSSAY (ex BARFONN)	S	10	0	
BLUE OCEAN (ex HOEGH SWALLOW)	R	2	0	

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-79)	Reference Page No.
BOLDURI	S	3	0	
BOW ELM	S	8	3	7
BRIDGESTONE MARU NO.3	R	13	1	8
BRIDGESTONE MARU NO.5	R	10	0	
CAPO OVEST (ex MARIOTTE/AEOLOS)	R	12	2	8
CAVENDISH	R	8	3*	9
CELSIUS	S	0	0	
CENTUM	R	1	0	
CHEMTRANS WEGA (ex BAVARIA MULTINA)	S	2	1	10
CHIHANI BACHIR	I	1	0	
CLERK MAXWELL	R	13	6*	9
CORAL ISIS	S	3	1	10
CORNUCOPIA	R	1	0	
DANIAN GAS (ex PHILLIPS ARKANSAS/ AMY MULTINA)	R	10	5	11
DELTA GAS	S	4	1	12
DESCARTES	I	8	0	
DEVONSHIRE	R	5	5	12
DISCARIA (ex CYPRESS/FERNVALLEY)	R	10	2	13
DUBULTY	S	2	0	
DZINTARI	S	3	0	
EDOUARD LD	I	2	0	
ERIK RAUDE (ex MUNDOGAS BERMUDA)	S	12	1	13
EL PASO ARZEW	I	1	0	
EL PASO CONSOLIDATED	I	2	1*	14

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casulaties (1964-79)	Reference Page No.
EL PASO HOWARD BOYD	I	1	1*	14
EL PASO PAUL KAYSER	I	4	1*	14
EL PASO SONATRACH	I	3	0	
EL PASO SOUTHERN	I	1	2*	15
ENRICO FERMI	R	2	0	
EPSILONGAS	S	2	1	15
ESSO BREGA	I	10	0	
ESSO FUJI	R	6	0	
ESSO LIGURIA	I	9	0	
ESSO PORTOVENERE	I	9	0	
ESSO PUERTO RICO (retired 1976)	P	17	1	15
ESSO WESTERNPORT	R	2	0	
FARADAY	R	8	4*	16
FERNWAVE	S	7	2	17
FRITZ HABER (ex IRENE)	S	8	0	
GADILA	I	6	1*	17
GADINIA	I	7	0	
GALCONDA	R	1	0	
GALILEO (ex CERNOS/ZENON/AEOLOS II)	R	12	13	18
GALPARA	R	1	1	20
GAMBADA	R	6	4*	21
GAMBHIRA (ex BUTANAVAL/BUTANUEVE)	R	10	4	22
GAMMAGAS	S	7	1	23
GANDARA	R	3	1	23
GARBETA	R	4	0	
GARI	I	6	0	

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-79)	Reference Page No.
GARINDA	R	2	2*	23
GAS AL AHMADI	R	0	0	
GAS AL BURGAN	R	0	0	
GAS AL KUWAIT	R	1	0	
GAS DIANA	R	1	0	
GAS GEMINI	R	2	0	
GAS LION	R	11	2	24
GAS RISING SUN	R	1	0	
GASTOR	I	3	0	
GASTRANA	I	5	0	
GAY LUSSAC	R	10	11*	24
GAZANA	R	7	9*	26
GENOTA	I	4	0	
GEOMITRA	I	4	1	27
GIMI	I	3	0	
GOLAR FREEZE	I	4	0	
GOULDIA	I	4	1	27
GRAND REXTAR (ex BRIDGESTONE MARU NO.2)	R	15	0	
GREAT CRANE (ex GOSHU MARU)	R	18	3	27
HAMPSHIRE	R	5	4*	28
HARDANGER	S	7	1	28
HASSI R'MEL	I	8	1	29
HAVFROST	R	13	2	29
HAVIS	R	9	2	30
HEBE	S	3	2*	30
HELIOS (ex FERNBANK)	S	3	0	
HERA	R	2	0	
HEROS	S	1	0	

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-79)	Reference Page No.
HESPERUS (ex FERNBROOK)	S	3	0	
HILLI	I	4	3	30
HOEGH GANDRIA	I	2	1	31
HOEGH SHIELD	S	10	3*	31
HOEGH SKEAN (ex HOEGH MULTINA)	R	8	1	32
HOEGH SWIFT	R	2	0	
HUMBOLDT	S	11	10*	32
INGE MAERSK	S	7	2	33
ISABELLA (ex KENAI MULTINA)	I	4	1*	34
ISFONN	R	12	1	34
IZUMISAN MARU	R	9	0	
JOSEPH P. GRACE	R	15	14	34
JOULE (ex HAVGAS)	R	14	2	36
JOYAMA MARU	R	14	0	
JULES VERNE	I	14	4	36
KANAYAMA MARU	R	9	0	
KATRISA (ex ROLAND/TRINA MULTINA)	R	11	1	37
KAZUTAMA MARU	R	13	0	
KHANNUR	I	2	1	37
LAIETA	I	9	0	
LARBI BEN M'HIDI	I	2	0	
LAVOISIER	S	17	2	37
LIELUPE	S	1	0	
LINCOLNSHIRE	R	7	11*	38
LNG AQUARIUS	I	2	0	

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-79)	Reference Page No.
LNG ARIES	I	2	0	
LNG CAPRICORN	I	1	2*	39
LNG GEMINI	I	1	1	40
LNG LEO	I	1	0	
LNG LIBRA	I	0	0	
LNG TAURUS	I	0	0	
LNG VIRGO	I	0	0	
LORD KELVIN	R	1	1	40
LUCIAN	I	5	0	
LUIGI CASALE (ex CAPELLA/FRANKLIN)	R	12	1	40
LUIGI LAGRANGE	R	3	0	
M.P. GRACE	R	12	6	40
MAGELLAN	S	2	0	
MANDRILL (ex MALMROS MULTINA)	R	5	0	
MARIANO ESCOBEDO	R	12	0	
MARINE EAGLE (ex PARKERSBURG/ESSO PARKERSBERG/FORT CORNWALLIS)	R	10	5	41
MAYORI	S	2	0	
METHANE PRINCESS	I	15	2	42
METHANE PROGRESS	I	15	7*	42
METHANIA	I	1	0	
MONGE	R	2	0	
MONOMER VENTURE (ex ESSO CENTRO AMERICA/ ESSO VENEZUELA/TARANCO/ MONTEBELLO)	R	17	4	43
MONTANA	I	4	0	
MONTERREY	R	1	0	
MOSSOVIET	R	0	0	

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-79)	Reference Page No.
MOSTAFA BEN BOULAID	I	3	3*	44
MUNDOGAS AMERICA (ex GARMULA)	R	7	9*	44
MUNDOGAS ATLANTIC	S	10	0	
MUNDOGAS BRASILIA	S	18	0	
MUNDOGAS EUROPE (ex KRISTIAN BERKELAND/ FERNWIND)	R	11	2	45
MUNDOGAS NORTE (scrapped 1971)	P	18	0	
MUNDOGAS PACIFIC (ex GAS MASTER/FERNWOOD)	R	12	2	46
MUNDOGAS RIO	R	12	2	46
NEKTAR	R	4	0	
NESTEFOX	S	2	0	
NESTOR	I	2	0	
NORMAN LADY	I	6	1	47
NORTHERN ARROW	R	1	0	
NORTHERN EAGLE	R	1	1	47
NUEVA LAREDO (ex SYDFONN)	R	1	0	
NYHAMMER	R	4	0	
NYHAVN	R	11	1	47
OGDEN BRIDGESTONE	R	6	3*	47
OGDEN GENERAL	R	4	0	
PALACE TOKYO	R	5	0	
PASCAL	S	3	1	48
PERMIAN GAS (ex CAP D'ANTIBES/GLOBAL GAS)	S	11	2	48

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-79)	Reference Page No.
PETROGAS I (ex PAUL ENDACOTT/ NORFOLK MULTINA/ CASSIE HILL)	R	15	0	
PETRON GASUL (ex BRIDGESTONE MARU/ BRIDGESTONE MULTINA/ CONTANK BRIDGESTONE)	R	17	2	48
PINE QUEEN	R	5	0	
PIONEER LOUISE	R	3	1	49
POLAR ALASKA	I	10	5	49
POLLENGER (ex LNG CHALLENGER)	I	5	4*	50
PUERTO RICAN	R	8	1	50
PYTHAGORE (ex ARQUIMEDES)	R	12	4	51
RAZI	R	2	0	
REYNOSI	R	0	0	
RYE GAS (ex CAP MARTIN/SAVOIE/ CRYSTAL)	S	16	1	51
SANT JORDI	I	2	1*	51
SINE MAERSK	S	3	0	
SOFIE MAERSK	S	2	0	
STAFFORDSHIRE	R	2	0	
SUN GAS	R	2	0	
SUN RIVER	R	5	0	
TATSUNO MARU	R	12	1	52
TELLIER	I	6	0	
TOKUHO MARU	R	5	0	

VESSEL NAME	Cargo Tank Type	Number of Years in Service	Number of Reported Casualties (1964-79)	Reference Page No.
TOYOSU (ex TOYOSU MARU/CALTEX/ LISBON/SUNSET)	R	2	1	52
TROPIGAS FAR EAST	R	12	0	
VASCO DE GAMA	S	3	2*	52
VENATOR	I	6	0	
VESTRI	S	7	0	
WILLIAM R. GRACE	R	15	8*	53
WILTSHIRE	R	11	2	54
WORLD BRIDGESTONE	R	8	1	54
WORLD CONCORD	R	3	0	
WORLD CREATION	R	3	0	
WORLD RAINBOW	R	8	0	
WORLD VIGOUR	R	2	0	
YAMAHIDE MARU	R	13	0	
YURMALA	S	3	0	
YUSHO MARU	R	8	0	
YUYO MARU	R	0	0	
YUYO MARU NO. 10 (TOTAL LOSS 1974)	R	8	1	54

*Casualty or Casualties reported in 1979.

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
AEGIS DILIGENCE	11,706	Greek	Cargo Atlantica Nav. S.A.	1968	R -48

Feb. 13, 1969 At Sea
Machinery Damage

As Alexander Hamilton, Panamanian flag, while on loaded voyage from Punta Cardon, Venezuela to Buenos Aires, an abnormal noise was heard from the main engine. Inspection showed blower rotor blades bent, shaft and bearings damaged and casing scored. Unit was blanked off and vessel proceeded at reduced speed. A new blower unit was air freighted to Buenos Aires and installed during 4-day stay at the port.

April 20, 1969 At Sea
Machinery Damage

As Alexander Hamilton, Panamanian flag, while enroute Puerto Miranda, Venezuela to Buenos Aires sustained damage to port side electrically-driven air compressor due breakage of crankshaft. Repaired at Bilbao, Spain in June 1969.

June, 1969 ?
Machinery Damage

As Alexander Hamilton, Panamanian flag, while repairing at Bilbao, Spain, master claimed damages to two cooling water pumps, cause and date unknown.

Oct. 4, 1968 At Sea
Weather Damage

As Alexander Hamilton, Panamanian flag, sustained pounding damage to shell plating forward due heavy weather on voyage from Norway to Strait of Florida, for orders. Repairs surveyed at Bilbao, Spain, June 1969.

Jan. 11-15, 1969 At Sea
Machinery Damage

As Alexander Hamilton, Panamanian flag, sustained damage to pistons of refrigerating gas compressors Nos. 1 and 3 while on passage Curacao to Santos.

June 25-26, 1971 At Sea
Weather Damage

As Alexander Hamilton, Panamanian flag, sustained heavy weather damage enroute from San Lorenzo, Argentina to Trinidad for orders. Water in side ballast tanks fell and water leaked into the void spaces around Nos. 1, 2 and 3 gas tanks and into No. 2 cofferdam. Small cracks found in welding of inner longitudinal bulkheads of side ballast tanks. Sounding pipe to No. 2 ballast tank cracked, allowing water enter cofferdam. Vessel put in St. Vincent, Cape Verdi Islands overnight and then sailed for Rotterdam for full examination of damage.

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
AEGIS DILIGENCE cont'd.					
Jan.14-15, 1973 In Port Contact Damage	As Alexander Hamilton, Panamanian flag, while tied up at Bilbao, Spain, was struck by Spanish steamer that was in lay-up and broke her mooring lines due to a strong wind. The Alexander Hamilton in turn struck Liberian motor vessel El Gavilan. Both the Alexander Hamilton and the El Gavilan sustained some minor damages.				
Oct. 28, 1975 In Port Engine Room Explosion; CONSTRUCTIVE TOTAL LOSS	While at Laurium Roads, Greece, fire occured in the engine room following explosion. Further explosion occured. Abandoned by crew. Fire raged for several days. Vessel subsequently towed by two salvage tugs and securely beached in lat. 37 47N, long. 24 05E, three days later, with fire still burning in engine room and double bottom missing. According to report, anchorcables were cut and vessel towed to isolated cove north of Laurium in view of possible danger to town of Laurium. On Nov. 13, fire appeared burnt out. Vessel towed Sarpsborg, Norway, in Feb. 1977 for long repair period.				
ANTILLA BAY	53,424	Neth.Antilles	Nedlloyd Bulk B.V.	1973	R -48
Feb.12-13, 1973 In Port Weather Damage; Contact; Stranding.	While loading propane at Zueitina, Libya vessel stopped loading on account of heavy weather and, endeavouring to reach open sea, scraped buoy, propeller fouled, two anchors lost and rudder not responding, strong winds pushed her towards beach, and she grounded. Vessel refloated 36 hours later with assistance of two tugs. Cargo on board at time of incident was 408 barrels of propane. Vessel was towed to Toulon, France, for repairs. At time of loading vessel had not yet been delivered to its owners and was still the responsiblity of Constructions Navales et Industrielles de la Mediterranee, La Seyne. Vessel later arrived June 3rd at Port de Bouc from Toulon, France.				
Oct. 31,1979 In Port Machinery Damage.	At Kobe, Japan, owners requested survey of economiser damage. No other details.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
ANTILIA CAPE	29,540	Neth.Antilles	Nedlloyd Bulk B.V.	1968	R -51
April 7,1973 Power Failure	At Sea	On loaded voyage from Ras Tanura, Saudi Arabia, to Corpus Christi, Texas, severe damage sustained to No. 1 port generator, allegedly due automatic paralleling process becoming defective and causing the circuit-breaker to close while machine was out of synchronization with result that vessel had complete power failure. Upon restoring power vessel proceeded on voyage. Vessel put into Durban, S.A., where examination found considerable damage to generator. Vessel put damaged generator ashore and proceeded with two diesel-driven generators.			
ARCTIC TOKYO	71,500	Liberian	Arctic LNG Transportation Co.	1969	I -162
Sept.14, 1971 Weather Damage	At Sea	Vessel reported heavy weather damage to No. 1 cargo tank insulation. Arrived 8 days later at Yokohama from Kikiski, Alaska and sailed 2 days later for Nikiski. No details of damage.			
July 15, 1973	?	Left Nikiski, Alaska for Vancouver to repair bow damage. Arrived Vancouver July 19, and left on July 22nd. No details of the damages or cause stated.			

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE; TEMP. C
ARISTOTLE	5,123	Panamanian	The Counties Ship Management Co. Limited	1945 Rebuilt: 1958	I -162
Jan. 9, 1965 Lost port anchor	In Port	As Methane Pioneer, British Flag, while proceeding from Canvey Island, U.K., to Grangemouth, lost port anchor, no chain, about nine cables from Sea Reach No. 7 Buoy in Thames Estuary. No other details.			
April 7, 1965 Machinery Damage	At Sea	As Methane Pioneer, British Flag, put in Belem, Brazil, on voyage from Rio de Janeiro to Houston. Water in engine room bilges and tunnel. Auxiliaries pumped dry but reflooded. Valves tested but local repairs unsatisfactory. Seaworthy certificate issued to Trinidad only. Left Belem 3 days after arrival. No other details.			
Aug. 26, 1966 Machinery Damage	In Port	As Methane Pioneer, British Flag, at Port de Bouc, France, generator crankshaft broken, requiring renewal as well as bearings, etc. No other details.			
Nov.21, 1966 Broke down	At Sea	As Methane Pioneer, British Flag, main engine broke down at sea on voyage from Puerto la Cruz Venezuela to Buenos Aires, and vessel drifted for two days while effecting repairs. Proceeded on voyage to B.A. at reduced speed. Damages consisted of No. 1 cylinder liner fractured, piston skirt fractured in two places, Nos. 2, 3 and 4 main journals scored, No. 2 and 4 main bearings white metal wiped, No. 3 main bearing white metal broken and partly missing and corresponding lower shell broken. Failure of this bearing apparently originated all damages. Left B.A. after nine days in port for Japan, and put back to B.A. the same day with main engine damages. Several main bearings heavily wiped. Finally departed B.A. 30 days after putting back with engine damages.			

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
ARISTOTLE cont'd.					
Dec. 12, 1967 Machinery Damage	?	As Aristotle, surveyor appointed at Marseilles reporting No. 4 cylinder liner broken at top flange, requiring renewal. Alleged cause unequal tightening of liner when fitted by crew and subsequent aggravation by corrosion.			
Feb. 14, 1969 Crew Negligence Damaged Pumps	?	Two cargo pumps in tanks No. 2 and 3 damaged by alleged crew's negligence in overfilling with lubricating oil. Repairs completed at Marseilles.			
Sept. 27, 1970 Stranding in River	In Port	Stranded in River Coatzacoalcos, Mexico, on voyage from Puerto la Cruz to Minatitlan, loaded with propane and butane gas. Refloated two days later with tug assistance. Apparently no damage sustained by bottom in mud. Left for Puerto Miranda 3 days later. At Boston drydock Jan. 1971, found bottom plating damaged by grounding.			
Nov. 24, 1970 Heavy Weather Lost Rudder	At Sea	Lost rudder about 200 miles north of Azores in gale force winds on voyage from Arzew, Algeria, to Boston with methane cargo. Tug towed vessel to Boston for 14 day tow. After discharge drydocked at Boston. Rudder damage probably due to pintle falling out, cause unknown, and subsequent heavy weather induced stock to fracture, with loss of rudder.			
On July 24, 1971 -		Vessel placed at Recife, Brazil for use as a storage vessel. No longer in class, but still afloat and in Lloyd's Register but not carried in Clarkson's Tanker Register.			

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
ATLANTE	53,400	French	Sogecom	1973	R -48

Feb. 21, 1974 — At Sea

As Providence Multina, French Flag, enroute Ras Tanura, Saudi Arabia to Spain, vessel reported main engine breakdown off Cape Agulhas, South Africa lat. 35 01S, long. 20 20E, drifting north at one mile per hour. Vessel expects restart engine in 3-1/2 hours. Five days later report that vessel proceeded under own power.No indication of when engine restarted.

Sept. 6, 1979
Lightening Damage — In Port

At Zone A, River Plate Estuary, Argentina, while approached by lpg tank Lincolnshire for lightening, reported contact with other vessel, both sustaining damage. No other details.

BEAVA (LPG/Oil)	9,470	Liberian	Avanti S.S. Co.	Rebuilt:	1945 1962	R -41

Dec.16, 1973 — In Port
Hit while anchored; Scrapped 10 months after incident

While anchored at Ras Tanura, Saudi Arabia, struck by ore/oil vessel OSWEGO FREEDOM and sustained extensive damage in way of amidships accommodation and port side holed and leaking from No. 3 wing tank (oil Tank) that contained naphtha. Other vessel only superficially damaged on bow with no cargo leakage, and she sailed next day for Bahrain for repairs to Suez Canal light. Aramco, terminal owners, refused to let BEAVA dock for safety reasons. Discharged naphtha into barges and repaired at Bahrain for two weeks and then left for Japan. Vessel was scrapped in October 1974 at Taiwan.

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
BEN FRANKLIN	120,000	French	Gazocean Armement	1975	I -165
Dec. 1-2, 1976 Broke Moorings in violent wind	In Port	Broke moorings at Marseilles, during a violent windstorm, where winds reached 183 kph, and struck Panamanian steamer FRANCESCA which was crushed and sank. No details on damages sustained by BEN FRANKLIN. (Vessel reported to be in yard at time of casualty. Cargo and ballast tanks were empty. Owner reports that vessel was not at LNG berth, and mooring facilities were inadequate.)			
Jan. 20, 1979 In near gale winds broke shackle of mooring chain	In Port	In strong winds, near gale force, last few days while in lay-up at Hyeres, France, vessel broke a shackle of mooring chain. Next day when winds moderated vessel reconnected to buoy. Vessel remained at anchorage while waiting for winds to abate to reconnect.			
BOW ELM	7,418	Norwegian	A/S Rederiet Odfjell	1971	S -104
June 21, 1973 Collision	In Port	Collided with tanker IRVINGSTREAM, at anchorage entrance to Saint John, N.B. harbor. Bow Elm was loaded with caustic soda. Other vessel's damage confined to bow, consisting of 6 bow plates, internals, part of stem and anchor pockets to renew. Bow Elm sustained hull damage amidships extending below waterline. Necessary renew 5 shell plates and fair adjacent plates, frames, brackets and deck plating, with repairs completed at Jacksonville.			
Apr. 24, 1974 Collision	In Port	Collided with motor research vessel IDA GREEN and then struck U.S. Army Corps Hopper Dredger, A Mackenzie, which sank in Houston Ship Channel, Texas. The dredger was scrapped following the collision. The IDA GREEN sustained a crumpled bow but returned to port under her own power. The BOW ELM sustained a gash about 10 ft. long and 18 in. wide just above the bulbous bow. No information on the status of cargo on BOW ELM.			
Aug. 7, 1977 Stranding	At Sea	Stranded 3-1/2 miles off Florida coast near Fowey Rocks Light in lat. 25 31 48N, long, 80 06 12W. Lightered part of the bunkers and was refloated next day. Cargo consisted of butane and butadiene. No structural damage and no danger reported by US Coast Guard spokesman. Later report alleged vessel had two holes. Vessel arrived Houston, Texas, 5 days after stranding.			

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
BRIDGESTONE MARU III	46,720	Japanese	Japan Line Limited	1966	R -41
Feb. 16, 1966 Fire in Building Yard	In Port	At fitting out yard at Nagoya, Japan about 1 month before delivery, fire in No. 3 tank, insulation burnt, deck plating damaged. Fifteen dock workers killed and others gassed. The fire in the polyurethane insulation suffocated the workers killed.			
CAPO OVEST	14,800	Italian	Cia.di Nav. Cossira S.p.A.	1967	R -45
Oct. 21, 1970 Contact in Kiel Canal	In Port	As MARIOTTE, French Flag, collided lightly with Finish vessel MALMI, with a cargo of coal, in siding at Konigsforde, Kiel Canal. Both vessels were slightly damaged but proceeded. MARIOTTE enroute Pascagoula for Uusikaupunki, Finland.			
May 20, 1974 Engine Damage	At Sea	As MARIOTTE, had to return to port of Dunkirk, France, twice within 24 hours owing to engine damage. No details of the nature of the damage or the time to repair it were given.			
BERGA	6,310	Algerian	Algerienne, Cie., Nationale	1967	S -45
Nov. 22., 1969 Contact in Canal	In Port	As Pascal, French flag, in ballast enroute Rouen for Riga, contacted Danish motor vessel KRETA in siding at Fischerhutte, Kiel Canal, West Germany. Both vessels were slightly damaged but proceeded. No other details.			
May 7, 1970 Hull Damage	In Port	Sustained hull damage during a storm in the port of Algiers, Algeria. Entered dock at Marseilles for repairs estimated to take about 10 days. No details of cargo status or repairs.			

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE.: TEMP. C
CAVENDISH	40,213	British	Houlder Bros.	1971	R -45
June 28, 1976 Cargo Condenser Damage	In Port	While repairing at Cadiz, Spain, master requested surveyor to inspect damage to cargo condenser. No other details.			
Feb. 26, 1978 Weather Damage in Port	In Port	While loading butane at Escombreras, Spain, parted moorings due strong wind, damaged shore lines, valves etc. Contacted tanker JUAN DE CARDONA berthed near by. Damage to other vessel confined to bulwarks and stanchions on forecastle head. CAVENDISH damaged shell way nos. 1 & 2 ballast tanks slightly and dragged mooring buoy under stern lightly damaging propeller.			
Aug. 10, 1979 Booster pump damage	In Port	Reported at Cartagena, Spain, with booster pump damage. Surveyor attended on board next morning and found damaged booster pump had already been repaired by crew members.			
CLERK MAXWELL	11,753	British	Houlder Bros.	1966	R -50
Feb. 28, 1967 Pump Repairs	?	Put in Durban, S.A. for pump repairs, enroute Buenos Aires for Ras Tanura, S.A. Left Durban 8 days later. No details.			
June 19, 1967 Hit Wharf	In Port	Contacted wharf at Mar del Plata, Argentina and vessel and wharf sustained slight damages. Nose stem plating way of 25 foot draft set in and torn over nine inches and breasthook of forepeak buckled. Temporary repairs made in port. No information on extent of damage to wharf.			
Dec. 30, 1967 Stranding Twice	In Port	While in ballast reported grounded in Buenos Aires south entrance channel. Refloated with tug assistance next day but grounded second time in the same channel, where also fouled propeller with towrope, which later freed. Vessel refloated following day and proceeded on voyage.			

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
CLERK MAXWELL cont'd						
Jan. 9, 1977 Double Bottome Contamination	?	Arrived Petit Couronne, Rouen, France, with fractured ballast line No. 1 and 2 double bottom tanks contaminated by leakage of fuel oil via forepeak ballast line, which passes through No. 1 deep tank which was fuel tank. Crew to clean tank and new pipe to be welded in place during next voyage				
July, 1978 Heavy Weather Damages	At Sea	Reported July 26, at Rotterdam with heavy damage. Arrived July 24 from Samsun, Turkey. Sailed from Rotterdam August 25 for sea trials. No details of damage provided.				
Jan. 20/26, 1979 Heavy weather damages	At Sea	Sustained heavy weather damages on loaded passage from Tees, UK, to Houston, Texas. Bottom shell plating fractured 15 locations in way of double bottom tanks. 8 fractures in No. 1 cargo tank in way of anti-lift chocks. Shell heavily indented and fractured in way of starboard anchor. Repaired at Curacao from 14 Feb. to 14 March.				
CORAL ISIS		5,500	Neth.Antilles	United Gas Carriers	1976	S -48
July 6, 1978	In Port	Grounded in River Scheldt for 7-1/2 hours. Vessel with engine damage, was being towed Apparently grounding occured while manoeuvring. Engine "full out" and could not be started again so vessel drifted. Tug tried to hold vessel from grounding, but cable broke.				
CHEMTRANS WEGA		6,000	West German	Chamikaliern Seetransport G.m.b.H.	1977	S -104
June 8, 1978	In Port	Enroute Rendsburg, Kiel Canal, W.Germany for Stade, W. Germany, in ballast, alleged to have damaged dophin No. 63 in siding at Schulp. Vessel proceeded, apparaently undamaged.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE TEMP. C
DANIAN GAS		26,504	Liberian	Reliance Gas Transport, Monrovia	1969	R -46
Jan.23, 1969 Collision	In Port	As Phillips Arkansas, Liberian Flag, collision with Russian motor vessel Nemirovich Danchenko in Flushing Roads, Belgium, during dense fog. Engine room of Russian vessel reported flooded, cutting off the engines, and she was towed by salvage tugs into Flushing harbor. The gas tanker was arrested, at the request of the owners of the Russian vessel. Damages confined to ram bulb bow showing six shaped plates indented and internals in way buckled. Repairs deferred to owner's convenience. (Apparently gas tanker on maiden voyage. Not stated if carrying cargo).				
July 23, 1969 Hit Dock	In Port	As Phillips Arkansas, Liberian Flag, damage sustained while berthing at Buenos Aires. Shell plates port side in way of frame No. 39 from aft and internals buckled. Repairs deferred.				
Nov. 14, 1969 Pump Damage	At Sea	As Phillips Arkansas, Liberian Flag, while on passage from Aruba to Rotterdam discovered damage to cargo pumps allegedly in consequence of manufacturer's defect. Six cargo pumps removed, reconditioned or renewed.				
April 16, 1971 Grounding, Contact Damage	?	As Amy Multina, Liberian Flag, while drydocking at Genoa, vessel reported grounding and contact damage and requested attendance of surveyors. No other details provided.				
Oct. 10, 1978 Fire in Deck Pump	In Port	As Danian Gas, while discharging propane at Donges, France, deck pump caught fire. Vessel had discharged about 900 tons of propane at time of fire. 14,000 tons of propane were on board. Refinery fireman extinguished the fire in 30 minutes. For safety sake the vessel was towed to sea. Void spaces were inerted, the defective pump repaired, vessel returned to port and completed discharging.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
DELTAGAS		5,500	West German	Sloman Neptun	1975	S -48
Jan. 15, 1977 Hit Lock Gate	In Port	When entering locks at Brunsbuttel, W.Germany, contacted lock gate which damaged. Vessel, loaded with butadine for United States, apparently undamaged and proceeded. No additional details available.				
DEVONSHIRE		52,630	British	Bibby Bros. & Co.	1974	R -48
Jan. 23-24, 1975 Ranging Damage	In Port	Damaged shell plate against fender at Corunna, Spain, and also touched bottom, probably at the dock, due to swell. An estimated 80 tons of steel required replacement or repair. Starboard shell plating indented at 7 locations in way of Nos. 1, 2, 3 and 4 cargo tank void containment spaces. The starboard bottom plating set up with damages to internals in way Nos. 4 and 5 double bottom tanks below No. 4 cargo tank.				
Feb. 7, 1975 Tug Contact	In Port	Contact with Tug Ursus Quinto at Carthagena. Starboard shell plating indented in way of No. 2 cargo tank void containment space.				
Feb. 26, 1975 Explosion Main Engine	At Sea	Explosion in main engine exhaust trunk during passage from Tarragona, Spain, to Gibraltar. Forward main engine turbo-blower turbine blades distorted and fractured in way of bonding wire holes and diffuser ring distorted and scored. Turbine to reblade and diffuser ring renew.				
Aug. 12, 1978 Hull Damage Transferring Cargo at Sea	At Sea	While transferring cargo while drifting off Crete, contacted Garmula, Starboard sheerstrake and deck stringer badly buckled and fractured in way of after accommodation space with internal structures in way, also upper deck bulwark set in & buckled over 12 meters. Some sounding pipes and lining panels of three cabins affected. No damages Garmula.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE TEMP. C
DEVONSHIRE cont'd						
Dec. 3, 1978 Generator Damage	At Sea	At Izmit, Turkey, surveyed extensive damage to engine driving generator which required renewal of cracked engine cylinder block as well as renewal of liners and pistons, etc. of Nos. 7 and 8 cylinders.				
DISCARIA		22,240	Norwegian	Norwegian Creditors	1969	R -48
Nov. 9, 1977 Engine Trouble	At Sea	As Fernvalley, Norwegian Flag, anchored in Nevagissey Bay, South coast of England, overnight with engine trouble. No other details given.				
Feb. 6, 1978 Hit Canal Bank	In Port	As Fernvalley, Norwegian Flag, during transit of Panama Canal, in ballast, Denmark for Los Angeles, California, struck canal bank. Berthed at Balboa for 3 days for temporary repairs and then proceeded.				
EIRIK RAUDE		6,170	Norwegian	Einar Bakkevig	1967	S -40
Aug. 23, 1975 Explosion & Fire; CONSTRUCTIVE TOTAL LOSS	In Port	As Mundogas Bermuda, Norwegian flag, explosion in boiler followed by fire while discharging vinyl chloride at Cartagena, Col. Colombian Navy and local fire department assisted with 80 firemen fighting the blaze. The vessel was towed from the wharf still afire. Cargo seems to be undamaged by the fire. Two crew were dead and ten injured. Fire produced severe damage to engines, accommodations and bridge structure. Causes of fire not stated. In December declared a CTL and towed to Kristiansands S., Norway, for 3 months repairs.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE TEMP. C
EL PASO CONSOLIDATED	125,000	Liberian	El Paso Marine Co.	1977	I -165
April, 1979 ? Membrane Damage	Left Savannah, GA, for Arzew, Algeria April 1, 1979, was reported April 5th bound Dunkirk, France for repairs to membrane damage. Localised areas of buckling affecting the tank crown, side bulkheads and forward and aft transverse bulkheads in addition to damage to lower surfaces. Vessel sailed from Dunkirk December 23.				
EL PASO HOWARD BOYD	126,000	American	El Paso Marine Co.	1979	I -165
June 7, 1979 In Port Stranded due steering failure.	Enroute down Chesapeake Bay for sea trials before being delivered, went aground in the York Spit Channel, caused by the failure of an hydraulic pump that controls the vessels rudder. She was refloated 2-1/2 hours later. Vessel, in ballast, apparently was not damaged.				
EL PASO PAUL KAYSER	125,000	Liberian	El Paso Marine Co.	1975	I -165
June 29, 1979 At Sea Stranded, ladened, Straits of Gibraltar	Stranded in the Straits of Gibraltar after avoiding a collision, ladened with 99,500 cubic meters of LNG. Fog prevailed at time of stranding. Heavy bottom damage. Starboard side and bottom wing tanks tidal. July 4, vessel refloated and anchored Algeciras Bay where all cargo was transferred to EL PASO SONATRACH. Early estimate suggest 2,500 tons of steel needed to repair vessel at cost to top $20 million mark. Vessel anticipates returning to service early 1980.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
EL PASO SOUTHERN		126,020	American	El Paso Marine Co.	1978	I -165
March 29, 1978 Steering Failure	InPort	After departing shipyard Newport News, VA, for sea trials, stranded James River for approximately 2 hours. Problem reported minor steering malfunction. Damages, if any, not reported.				
January 4, 1979 Lost Anchor	In Port	While entering St.Nazaire, France, lost part of starboard anchor at anchorage. Anchor was broken. Spare anchor available on board.				
ESSO PUERTO RICO LPG/OIL		12,788	Panamanian	Exxon International Co. Retired:	1959 1976	P
Aug. 26, 1966 Boiler Trouble; Broke down at sea	At Sea	Broke down at sea off South American East Coast. Towed for a while by tug Angostura then by Esso Exeter, with tug standing by. The tow parted after five days of towing and both the Esso Exeter and the Esso Puerto Rico entered Rio de Janeiro, former with generator trouble and latter with boiler trouble. Esso Puerto Rico finally arrived at its destination, Buenos Aires, end of September.				
EPSILONGAS		5,600	West Germany	Unigas International	1977	S -48
September 1978	In Port	Was delayed with engine failure in Langesund, Norway ladened with 5,000 tons of vinyl chloride and spent some time anchored close to town. Several days later resumed voyage to South America. No other details provided.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
FARADAY		31,215	British	Houlder Bros.	1971	R -45
Oct. 25,1970 Fire at Fitting Out Berth	In Port	A fire occured in No. 1 tank at fitting out berth, believed due to welding operations which caused smouldering among two or three planks causing dense smoke. There was no damage to tank or ship.				
July 28, 1971 Insulation Contaminated	In Port	While entering Buenos Aires was contacted by a tug assisting another vessel and sustained shell plating damage. Fuel tank bulkhead fractured and some 30 tons of fuel leaked and contaminated 3,500 sq.ft. of six-inch thick glass-fibre insulation on double bottom tank top in way of No. 1 cargo tank space. rendering same useless. Bulkhead failure due inefficient welding, which failed. Vessel sailed next day.				
May 9, 1973 Grounding: Pump damage	?	At Singapore agents requested survey of grounding and cargo-pump damage. No details of either casualty provided.				
July 20, 1979 Turbo-blower damage	?	When blowers opened up for routine examination at Genoa, Italy, found main-engine turboblower rotors damaged requiring to be rebladed. Date and cause of damage unknown.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
FERNWAVE		12,000	Liberian	Shipfern Gas Corp.	1972	S -48
May 6, 1973 Hit while moored to Dock	In Port	While moored at Houston, Texas, was hit by motor bulk carrier COSMOS FOMALHAUT. Survey revealed gas carrier had extensive damage to port shell and internal members, also damage to starboard shell due contact with wharf at time of collision, necessitating renewal about 20 tons of steel. Vessel drydocking at Galveston for repairs. Other vessel surveyed for damages but no report given of result of survey.				
Nov., 17, 1973 Engine Room Fire	At Sea	Fire in engine room off East coast of England reportedly after fuel line in engine room exploded. Part crew taken off by Royal Fleet Auxiliary tank Olwen. Later towed to River Humber by tug. Damage reported to main engine, generators and cargo cooling system. Proceeded to Gothenburg, Sweden, for 3 weeks of repairs.				
GADILA		75,000	British	Shell Tankers (U.K.)	1973	1 -162
January 1979	7	Survey requested at Kobe, Japan, in respect of propeller damage sustained about three months earlier. No other details.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GALILEO	14,760	Chilean	Naviera Interoceangas S.A.	1967	R -45
May 28, 1968 In Port Stranded in River	As Cerons, French flag, inbound from Middlesbrough, U.K., grounded. In dense fog in River Scheldt off Saaftinge, Belgium, and was refloated about 9 hours later. No report of any damages.				
Jan. 21, 1972 ? Replaced Generator	As Zenon, Panamanian flag, #3 diesel generator was replaced at Rouen after it exploded at unstated location. No other details.				
Feb., 1972 At Sea Heavy Weather Damages	As Zenon, Panamanian flag, many pipes and valves fractured on deck and in engine room, four small cracks on deck over #3 tank, Honeywell and Whessoe gauges damaged, anchor cable twisted, electric crane in engine room dropped on engine top platform, making big dent, main engine indicator damaged and many other small damages due encountering heavy weather on voyage from Petit Couronne to Venezuela. Necessary remove 1,100 cubic meters of insulation in order to repair deck plating locate source of leakage. Insulation contaminated with ammonia.				
August 16,1972 ? Cargo Pump repairs	As Zenon, Panamanian flag, reported to have cargo pump damage and apparently made repairs at Maracaibo. No details of the cause or nature of damage.				
June 29, 1973 At Sea Collision	As Zenon, Panamanian flag, while proceeding from Kashima to Mizushima, Japan, to complete loading, struck mine-sweeper Koshiki 615, in heavy fog off East coast of Honshu Island in lat. 35 05 48N, long 140, 25 48E. Apparently two crew members of mine sweeper were injured but not seriously. Zenon proceeded to Mizushima with leaks in the forepeak and indents in the starboard bow plates. Both sides of the stem were slightly holed and dented.				

(Casualties cont'd next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GALILEO cont'd						
Oct. 1, 1973 Rudder damage	At Sea	As Zenon, Panamanian Flag, sailed on Sept. 26 from Havre for Houston, but returned with rudder damage. Vessel sailed two days later after replacing main steering pump port side.				
Dec. 7, 1972	At Sea	As Zenon, Panamanian flag, encountered heavy weather and water and gas was found in the insulating spaces in way of Nos. 1 and 2 cargo tanks and gas found in all three insulating spaces. Extensive gas freeing required before full extent of damages could be ascertained, at Marseilles. Cargo tanks were lifted up. Cracks found in double bottom tank tops. Approximately 3,300 cubic Meters of insulation required replacement. Extensive distortion of floor platings. Repairs took about 180 days or more.				
Mar. 15, 1975 Contact Damage	In Port	As Galileo, Liberian Flag, at Marseilles with contact damage sustained at unstated place and time. Port side shell plating badly indented in way of sea chest in #1 port wing tank. Two shell plates to be cropped and part renewed.				
May 30, 1975 Cargo Pump Trouble	In Port	As Galileo, Liberian Flag, at Punta Arenas, Chile, with No. 1 port side tank cargo pump damaged due lack of lubrication and evaporization of liquid in pump. Unable discharge No. 3 tanks with syphon and pressure system. Vessel to trade with Nos. 1 and 2 tanks only.				
March 8, 1976 Lost Anchor & Chain	In Port	As Galileo, Chilean Flag, Lost anchor and 9 shackles of chain in vicinity of Recalada pilot station entrance to Buenos Aires.				

(Casualties cont'd next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GALILEO cont'd.						
August 2, 1976 Lost Power, Drifted, Grounded	In Port	While maneuvering to anchor in Quintero Bay, Chile, reported drifting and subsequently grounded. No. 1 starboard double bottom tank sprung leak and repaired with cement box. Internal examination revealed about 40% of bottom plating within amidship's half length with stiffeners and floors set up.				
August 2, 1977 Fire .	At Sea	Fire on board, in unstated location, while in Concepcion Channel abeam Charles Island, Chile. Vessel spent four days at Punta Arenas. No further mention of fire or damages.				
Feb. 14, 1978 Generator Damage	At Sea	No. 1 auxiliary engine connecting rod failed and caused severe damages. Engine Block, crankcase, crankshaft, two cylinder liners and pistons required extensive repairs of renewals. Generators Nos. 2 and 3 examined in parallel and found satisfactory until 3rd unit can be repaired.				
GALPARA		53,000	British	P&O Steam Nav. Co.	1978	R -50
October 10, 1978 Fire in Deck Pump	In Port	While discharging propane at Dongan, France, deck pump caught fire. Vessel had discharged about 900 tons of propane at time of fire. 14,000 tons of propane were on board. Refinery fireman extinguished the fire in 30 minutes. For safety sake the vessel was towed to sea. Void spaces were inerted, the defective pump repaired, vessel returned to port and completed discharging.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GAMBADA		29,791	British	P.& O. Steam Nav. Co.	1973	R -51
Feb. 28, 1975 Diesel Generator Damage	?	No. 3 auxiliary engine damaged. Crankshaft, bedplate, one set of main bearings and one set of bottom end bearings required repair or replacement. No cause of damage given.				
March 21, 1975 Diesel Generator Damage	?	No. 2 auxiliary diesel engine required dismantling and rebuilding many components. Cause of damage not stated. Repairs are to be effected at sea by the crew.				
Sept. 16, 1977 Diesel Generator Damage	At Sea	No. 2 auxiliary engine damaged on voyage from Buenos Aires to Maracaibo. Two bearings seized and crankshaft considered beyond repair. A team from the manufacturers fitted a new crankshaft and bearings.				
March 12, 1979 Steering failure	In Port	Departing from Sloehaven, Nederlands, for Rotterdam, steering gear jammed 20 degrees to port and towed to Flushing anchorage, then towed to repair yard. Particles of cast iron found in hydraulic oil system.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GAMBHIRA	14,103	British	P. & O. Steam Nav. Co.	1969	R -48
June 16, 1973 In Port Cargo Pump damages			While discharging at Corpus Christi, Texas, port and starboard discharge pumps in No. 2 cargo tank sustained damages. At Curacao pumps landed ashore and sent to makers in France.		
Dec. 26, 1974 7 Insulation Damages			Double bottom tank top insulation below No 2 cargo tank damaged. Found wet with water about six inches deep at aft end. Insulation over whole area of tank top buckled and bulged to height of 18 inches with rubber sheet seal torn and insulation broken/ washed out. No. 1, 3 and 4 tank tops also have insulation bulged and distorted.		
March 4, 1975 At Sea Rudder Damage			Diverted to Honolulu rudder repairs. While loaded with cargo of ammonia, experienced rudder bearing trouble. At Honolulu the bearing was replaced. Cause not stated.		
April 13, 1976 In Port Two Lifeboats Damaged			While at Gibraltar for orders, No. 1 lifeboat, returning to vessel, became entangled with a rope trailing from the lifeboat. No. 2 liefeboat was launched to go to the assistance, but her propeller also became jammed by rope. Both lifeboats grounded and pounded on the rocks at the seaward end of the North Mole. Both lifeboats were badly damaged and were replaced.		

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GAMMAGAS	5,202	West Germany	Sloman Neptun	1972	S -48
Sept. 17, 1978 At Sea Machinery Trouble	Enroute to Havre, France, for Port Neches, Texas, put in Bermuda with machinery damage. No. 7 air inlet valve seat dropped out of cylinder cover and was broken in pieces between piston cover. Pieces of seat ring and valve found in Nos. 8, 9, 10, 11 & 12 cylinders. No. 7 & 8 units new liners, pistons and valves seats fitted, turbo-charger rotor, nozzle diaphragm and bearings renewed.				
GANDARA	22,500	British	P. & O. Steam Nav. Co.	1976	R -50
April 5, 1978 At Sea Windlass Problems	Enroute Shuaiba, Kuwait for Donges, France, reported windlass problems. Damage probably due to seawater ingress into oil of windlass hydraulic system. Port and starboard windlass fitted with new pumps.				
GARINDA	53,000	British	P. & O. Steam Nav. Co.	1977	R -50
Jan. 15, 1978 In Port? Stranding	Went aground north of Suez loaded with 30,000 tonnes of liquid gas from Ras Tanura, Saudi Arabia to Izmir, Turkey. Refloated 5 hours 35 minutes later and resumed transit of Suez Canal. No damages reported.				
July 10, 1979 In Port Stranding at Buenos Aires entrance	Stranded, part laden with gas, at South Entrance Channel to Buenos Aires. 53 hours later refloated with rise of river and tug assistance. Survey revealed no apparent damage due to the grounding.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C.
GAS LION	11,842	Norwegian	Kristian Gerhard Jebsen	168	R -50
Dec. 20, 1968 ? Cargo Pump Trouble	At Santos, Brazil, reported necessary to replace sumersible cargo pumps. Surveyor unable to sight pumps at Santos as they were immersed in cargo. No other information provided.				
July 28, 1975 At Sea Machinery Damage	Put in St. Michael's Ponta Delgada, Azores, with main engine damage, while enroute Rotterdam for Houston. Left St.Michael's 4 days later . No data on trouble.				
GAY LUSSAC	40,232	Panamanian	Gazocean Armement	1969	R -48
March 5, 1972 ? Cargo Pump Damages	At Punta Cardon, Venezuela, reported two damaged sealed submerged liquefied petroleum gas cargo pumps being airlifted to manufacturers at Costa Mesa, California. Cause of type of damage not specified.				
March 15, 1972 ?	Difficulties experienced with generator No. 2 regulator. Over preceeding six months all three generators have experienced similar troubles. Technicians from France adjusted the generator at Buenos Aires.				
March 24, 1972 In Port Hit Dock Wall	When entering Buenos Aires with tug assistance, contacted dock wall, sustaining shell plate damage. No other details of damages.				
Oct. 5, 1972 Cargo Pump Damage	Arrived Singapore Roads from Chiba, Japan, and requested survey on damage to No. 3 cargo pump, date and cause unknown. No details of damages.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSELS NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GAY LUSSAC cont'd					
Dec. .., 1972 At Sea Heavy Weather Damages					Enroute Mena al Ahmadi to Chiba, Japan, encountered heavy weather. Damage consists of fractured wing tank No. 1 stbd. inner bulkhead, allowing ingress of ballast water into cargo tank insulation, which now completely destroyed. Main deck in way of cargo tank set up.
Oct. 26-27, 1972 In Port Ranging Damage					Due to heavy sea vessel repeatedly bumped against jetty at Sarroch, Sardinia, causing extensive damage to jetty and dolphins. Vessel apparently undamaged because it sailed the same day for Brazil.
Nov. 26-28, 1974 At Sea Heavy weather damages					On laden passage from Kuwait to Mersin, Turkey, encountered heavy weather. Leakage through plating stiffener between No. 3 stbd. tank and No. 4 fuel oil double bottom. Two pumps No. 2 stbd. and No. 3 port cargo tanks with feed line insulation resistance to zero. Repairs carried out at Marseilles in January 1975.
March 18, 1975 In Port Grounding					Examined in drydock at Durban, South Africa, and no damage found due grounding at unstated location.
Jan. 10, 1976 ? Cargo Pump Damages					Enroute Persian Gulf for Barcelona, Spain, tested cargo pumps and found out of 9, only 4 fixed pumps operable and 1 removable cargo pump also inoperable. All 6 pumps to be sent back to Europe for repairs.
Feb. 22-25, 1978 At Sea Heavy Weather Damages					Encountered heavy weather in June 1977 aggravated by further alleged heavy weather in Febr. 1978. Nos. 4 & 5 port fuel tanks contaminated by salt water, Nos. 2 & 3 adjacent ballast tanks suspected damaged. Nos. 1 & 2 port ballast tanks and Nos. 1 & 2 starboard ballast tanks in communication. In addition fractures found in double bottom and in afterpeak. Repairs completed at Marseilles in March.
Dec. 12, 1979 At Sea Hit submerged object					While on part loaded passage from Rayway, N.J. to Philadelphia, PA, sustained hull damage due to striking a submerged object. A gouge 25 m in length, 35 cm in width and 6 cm in depth at turn of bilge, a 35 cm fracture in No. 1 ballast tank and No. 2 ballast tank flooded due to buckling of bulkhead in way.

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GAZANA		29,791	British	P. & O. Steam Nav. Co.	1972	R -51
Aug. 10, 1971 Fire in Fitting Out Yard	In Port	While at the fitting out basin in Liverpool, a fire occured in the insulation between the two skins of the hull of the vessel. It was restricted to one tank. It took firemen nearly eight hours to quell the blaze.				
Sept. 6, 1973 Machinery Damages	At Sea	Put into Sydney, Australia, as a port of refuge as result of generator and compressor breakdown. Vessel carrying small quantity of cargo for tank-cooling purposes. Crankshafts Nos. 2 and 4 generator diesel engines damaged and bedplate of No. 2 damaged. Cause of damage unknown. Resumed voyage after one week in port.				
Nov. 14, 1974 Machinery Damages	?	No. 3 Diesel engine generator oil found emulsified. Several days later No. 3 bottom end bearing failed, severely scoring crankshaft and causing deflection of shaft. Repairs made at Kuwait.				
Feb. 25., 1975 Machinery Damages	At Sea	No. 1 port generator engine connecting rod broke loose and piston seized in liner causing damage to unit. Diesel oil allegedly contaminated with fuel.				
March 23, 1975	At Sea	Stbd. generator engine apparently shut down on low lube oil alarm and evidence of overheating of bearings. Repairs were made at Buenos Aires.				
June 9, 1975 Contact damage	In Port	While anchored in Buenos Aires Roads contacted by lightening vessel motor liquefied gas/oil tanker LAVOISIER. Both vessels sustained damages, apparently minor as GAZANA sailed next day for Cape Town.				
June 14, 1978 Diesel Generator Damage	At Sea	Enroute Bahrain for Leghorn, Italy, alleged sustained diesel generator damage. Crankshaft bent 0.3 mm in way of No. 8 journal from forward. All main bearings and crankpin bearings wiped, with Nos. 6 & 8 crankpins severly and coloured blue.				
Jan. 19-20, 1979 Main engine overloaded	?	Various cylinder covers cracked in way valve pockets, alleged due overload of engine. Nos. 1, 7, 5 & 4 failed on March 22, Apr 7, May 6 and May 8 respectively.				
August 9, 1979 Main engine damage	?	At Santos, Brazil, surveyed and various parts of No. 2 cylinder found damaged, requiring replacement.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
GEOMITRA		77,731	British	Shell Tankers (U.K.)	1975	I -162
July 5, 1974 Fire While Abuilding	In Port	While under construction at Marseilles, fire broke out in No. 5 tank and was smothered under carbonic foam and temperature back to normal 4 days later. Cause and extent of damage will be ascertained later. No other data.				
GOULDIA		75,000	British	Shell Tankers (U.K.)	1975	I -162
Aug. 4, 1977 Machinery Damage	?	Due Osaka, Japan, and reported damage to the port generator. No other details.				
GREAT CRANE LPG/OIL		12,800	Panamanian	Great Crane Shipping Co.	1961	R -41
Feb. 25, 1969 Collision	At Sea	As Gohshu Maru, Japanese flag, collision with Swedish motor tanker THORNE in Lat. 04 56N, long. 98 15E, near entrance to Straits of Malacca. Gas carrier had some damage on port side and proceeded Singapore for survey and repairs. The tanker THORNE also put in at Singapore. No damage details.				
June 17, 1971 Collision	In Port	As Gohshu Maru, Japanese flag, collided with motor vessel ODER, at entrance to Tokyo Bay in fog. Both vessels damaged and in port. Gas tanker left two days later after discharging at Yokohama. No other details.				
Jan 28, 1974 Boiler Fire, Adrift	At Sea	As Great Crane, Panamanian Flag, had fire in boiler while in Arabian Sea due boiler cracked due heating and ignited oil. Gas tanker was towed to Yokohama, arriving there 28 days after the fire in the boiler. No other details.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METER	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
HAMPSHIRE		52,650	British	Bibby Bros. & Co.	1974	R -48
Oct. 12, 1976 Heavy Weather Damages	At Sea	Surveyed in drydock at Skaramanga, Greece, in respect of heavy weather damages allegedly sustained while riding out a typhoon on passage from Mena al Ahmadi to Japan. No details of the damages provided.				
April 13, 1978	At Sea	Enroute Lyngs Odde, Jutland, Denmark, to Dubai, No. 3 generator damaged apparently due to failure of thrust bearing. Engine to be stripped down and rebuilt, using new crankshaft, complete set of bearings and bedplate.				
Feb. 25, 1979 Lost Port Anchor	In Port	At Flushing, Netherlands, lost port anchor and chain. Spare anchor connected to remaining five lengths of chain at Gothenburg, Sweden.				
November, 1979 Heavy weather damage	At Sea	Enroute New Orleans, LA, for Turkey, with cargo of ammonia, put in Malta for emergency repairs to cracks to shell plating and frames, apparently due to heavy weather. Ship side plating subjected to heavy and dangerous panting. There is possibility that further damage was caused by contact with sandbank in River Mississippi.				
HARDANGER		7,418	Norwegian	Westfal-Larsen & Co. A/S	1972	S -104
Jan.16, 1978 Collision with Tug, Tug Crewman Lost	In Port	Outbound Houston Ship Channel collided with harbour tug MARS, which was assisting loaded steam tanker ESSO BARCELONA into berth at Exxon refinery, Baytown. One crewman of tug lost. No report of damages, if any.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C.
HASSI R'MEL	40,109	Algerian	Algerienne, Cie. Nationale	1971	I -160
Oct. 28, 1974 At Sea Stranding	Stranded off Faraman Lighthouse in the Rhone Delta loaded with 40,000 cubic meters of liquid gas. Was pulled off the next evening and proceeded to Fos, France, to discharge. Stranded on sand bottom and inspection revealed no damages. (Vessel was carrying LNG at time of casualty.)				
HAVFROST	11,400	Norwegian	P. Meyer	1966	R -51
Sept. 12, 1968 At Sea Collision	Collided with German motor vessel UHENFELS off Bat, near Flushing, Belgium. Both vessels seriously damaged at bow above waterline. Both vessels put into Antwerp. Havfrost left Antwerp 29 days later. No report of damage in detail.				
Sept. 29, 1976 ? Machinery Damages	Arrived Bajo Grande, Venezuela in ballast and requested a surveyor in respect engine exhaust channels, cargo pumps and air coolers. No other details provided. Vessel left 7 days later for Minatitlan, Mexico.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: Temp. C
HAVIS	15,441	Norwegian	A/S Havtor	1970	R -48
June 3, 1976 ? Rudder damage	At Singapore survey requested of rudder damage. No indication of cause or extent of damages.				
April 12, 1978 ? Bent Propeller Blades	At Gibraltar, while awaiting arrival of gas tank Lincolnshire to load ammonia, crew carried out own repairs to bent propeller blades. No cause of damage stated.				
HEBE	5,170	Norwegian	Helge R. Myhre	1976	S -48
Nov. 15, 1976 At Sea Repairs required	Left Santos, Brazil for Las Palmas, put back the same day and anchored in roads for repairs. Sailed for Las Palmas 6 days later. No indication of nature of repairs.				
April 17, 1979 In Port	During berthing at "DOW" terminal, Salvador, Brazil, contacted by tug TIMOTEO on rudder. Tug broke own rudder. HEBE proceeded and berthed normally.				
HILLI	126,227	Liberian	Cotaas-Larsen	1975	I -163 R - 45
Dec. 12, 1975 At Sea Propeller Damage	During her builder trials damage occured to the propeller. The vessel had no business at that time and therefore, was laid up at Stavanger in January after her delivery. The repairs were eventually made at Hamburg and took about two weeks. The cause and nature of the repairs were not stated.				
May 14, 1977 In Port Bolt in Cargo Line	While discharging her first cargo at Chiba, Japan, metal objects were discovered in the cargo lines and discharging was suspended. The vessel put out to sea to determine if there were any other foreign bodies in the cargo lines. The vessel arrived back at Chiba 55 days later and left the next day for outside Tokyo Bay with no explanation for				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
HILLI cont'd		the overnight visit. It arrived back at Chiba 37 days later and apparently discharged and sailed for Das Island, Persian Gulf 3 days after last arrival.				
July 28, 1978 Propeller Damage	?	Arrived Das Island, U.A.E. from Sasebo, Japan and discovered propeller damage. Put in Singapore August 31, for survey of damages. No other details provided.				
HOEGH GANDRIA		125,000	Norwegian	Leif Hoegh & Co. A/S	1977	I -163 R -45
Dec. 23, 1977 Contact while Moored	In Port	While lying at yard quay at Kiel, W.Germany, was contacted by floating crane Hebe II which was manoeuvering in yard. Gas carrier damaged and will be repaired in yard. Crane apparently undamaged. No details of damages to gas carrier.				
HOEGH SHIELD		8,610	Norwegian	Leif Hoegh & Co. A/S	1969	S -47
Jan. 25, 1974 Contact Damages	In Port	Anchor chain of gas carrier fouled propeller of motor vessel Alkman while both were apparently anchored at New Orleans. Contact occured between the vessels subsequent to the fouling of the propeller. Other vessel surveyed in drydoch at New Orleans. Gas carrier left 6 days after arrival. No apparent damages.				
Feb. 14, 1979 Stranded in port	In Port	Enroute Brazil for Buenos Aires reported grounded at B.A. south entrance channel. Vessel refloated next evening and proceeded B.A. No other details.				
Oct. 31, 1979 Blackout	In Port	Sustained blackout at Brevik, Norway, outbound for Penang, loaded but assisting tug has situation under control,Anchored Eidanger Fjord and repairs performed then proceeded.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
HOEGH SKEAN		52,000	Norwegian	Leif Hoegh & Co. A/S	1971	R -48
Nov. 22, 1976 Machinery damages	At Sea	As Hoegh Hultina, Norwegian flag, arrived Cape Town on voyage from Santos, Brazil to Westernport, Australia and agents report turbo-blower trouble and leaking safety valves. Vessel sailed two days later.				
HUMBOLDT		6,327	British	Houlder Bros.	1968	S -45
Oct. 21, 1969 Explosion while Cleaning	At Sea	While gas-freeing tanks at sea enroute Carthagena to Huelva, Spain, an explosion occured in the pump-room deckhouse, resulting in No. 1 after condenser waterbox being blown off with attached piping. Deckhouse side plating and stiffeners buckled. Condenser shell distorted and tube plate bent, resulting in flooding of pumproom. Ventilating trunk partially collapsed. Put in Cadiz, Spain, for 3 days.				
June 27, 1970 Engine Trouble	At Sea	Put in Falmouth, England, for 2 days with engine trouble. Vessel was enroute Antwerp for Santander, Spain, with a cargo of liquid gas.				
Sept. 18, 1974 Hit Lock Gate	In Port	When entering locks at Brunsbuttel, Kiel Canal, contacted lock gate and caused extensive damage to the latter. The vessel was only slightly damaged and proceeded. Vessel was on voyage from Riga, USSR to Havre at time of incident.				
April 7, 1975 Hit Canal Bank	In Port	On voyage from Havre to Riga,USSR, in ballast, struck Kiel Canal. Vessel proceeded with seaworthiness certificate. No details of damages, if any.				
Aug. 28, 1975 Hit Light Mast in Canal	In Port	On voyage from Riga, USSR for Havre, with a cargo of gas, damaged light mast in siding at Audorf in Kiel Canal. Vessel proceeded undamaged.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
HUMBOLDT cont'd.						
Oct. 7, 1976 Machinery Trouble; Ice Damages	At Sea	On voyage from Riga, USSR for Antwerp, anchored at Sunk with engine failure. When weather became more clement proceeded to Felixstowe, England to take aboard stores, engineers and effect necessary repairs. In Rotterdam later in the month the vessel was surveyed for the damages including damages due to encountering ice.				
Nov. 24, 1976 Boiler Repairs	?	Sailed from Rouen, and the same day put in Havre for boiler repairs. No details of damages or cause of same.				
Dec. 1, 1976 Machinery Damages	In Port	When sailing from Havre, alarm indicated a drop in lube pressure and pump found stopped. Vessel proceeded to loads at slow speed. Inspection found white metal scattered inside crankcase. Apparently main damage bottom end bearings and crankpins. Towed to Antwerp for repairs which completed in 32 days.				
March 1978 Aux. Boiler Damages	?	Both heating coils of bunker tank damaged and subsequently auxiliary boiler contaminated by oil deposits leading to damage of furnace crown. Furnace crown to be cropped and partly replaced at sea by boilermaker team.				
Jan. 31, 1979 Stranding due to power failure	?	Sustained power/steering failure and then grounded near Skein, Norway, just off Trosvika. Holed in bow but no damage to gas tanks and no leakage of propane. Vessel refloated without assistance and was towed to Rafnes, Norway.				
INGE MAERSK		12,060	Danish	A.P. Moller	1972	S -48
Nov. 22, 1974 Stranded in River	In Port	Inwards from Japan grounded in River Scheldt off Baudouin Locks and was refloated 4 hours later without assistance. Vessel left Antwerp 11 days later. No damages reported, if any.				
April 4, 1978 Cargo Machinery Failure	In Port	While approaching berth at Westernport, Australia, sustained cargo machinery failure. Remained at anchorage for 3 days prior discharging undergoing repairs.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
ISABELLA	35,500	Liberian	Middleburgh Shipping Co.	1975	I -160
Sept. 1, 1979 At Sea Engine-room explosion	An explosion damaged the engine-room while 480 miles south-west of the Azores, enroute from Houston, Texas. One man was seriously injured. Vessel put in to St.Michael's Azores, and departed next day for Gibraltar.				
ISFONN	18,790	Norwegian	Sigval Bergesen	1967	R -50
July 3, 1970 At Sea Machinery Damage	Enroute Rio Janeiro for Persian Gulf reported cylinder damage which was surveyed at Cape Town. A knock was traced to No. 2 unit of the main engine where water was found leaking from the piston head. The piston, skirt rings and liner were renewed. Excessive scale was found in the piston head and caused overheating and resulted in the piston head fractures. Vessel left Cape Town next day.				
JOSEPH P. GRACE	12,975	Liberian	Marine Transport Lines Inc.	1964	R -46
March 6, 1966 In Port Crew Negligence Damaged Condensers	Due alleged crew negligence in failing to maintain cooling water on refrigerator condensers, tubes found badly pitted and corroded, which will require retubing of both condensers. Repairs made in New York in June.				
Jul. 14, 1967 In Port Hit dock	Hit dock at Thames Haven, England. Two side plates renew, internals straighten and sundry other damages and removals. Drydocking not required.				
Feb. 14-19, 1967 At Sea Weather Damages	On passage from Fredericia, Denmark to East Coast of United States encountered heavy weather. Two keel plates part renew, two bottom plates renew and two bottom plates part renew, straighten internals, ten cracks in void tanks to repair, cargo tank insulation part renew, etc.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C

JOSEPH P. GRACE cont'd.

June 1, 1968 Machinery Damage	At Sea	While outwards from Tampa to Trinidad No. 2 main engine unit piston skirt and guide ring damaged and required renewal. Repairs apparently made at New York in July.
Sept. 10, 1968 Boiler Trouble	In Port	Vessel at Port of Spain for 2 days carrying out boiler repairs. In December the exhaust gas heated boiler was renewed at Aalborg, Denmark.
May 9, 1970 Grounding in River	In Port	Grounding in Cape Fear River, North Carolina. Keel set up slightly in way of lube oil tank. Repairs deferred until drydocked at Frederikshavn, in June 1971.
May 28, 1971 Hit Dock	In Port	Struck dock when entering at Frederikshavn. Heavy indentation in starboard bow. Strake to crop and part renew special steel and fuel-oil tank in way to empty and make gas free.
May 28, 1971 Fire in Cabin	In Port	Fire in crew member's cabin. Cabin burnt out. Inventory and sheathing to renew. Floor in cabin and alley way water damaged. Repairs made while at Frederikshavn.
June 8, 1971 Pump Room Flooded	In Port	Pump room flooded by fuel oil which claimed due to crew negligence. Measures taken to empty pump room into coastwise tanker. Incident occured at Aalborg, Denmark.
Aug. 23, 1974 Fire	In Port	While at Leghorn, Italy, with 7,746 tons of butane gas, took fire while in roadstead awaiting berth. Port fire brigade, harbor master, motor launches and tugs attended and fire was extinguished in about 4 hours. Cause of fire unknown and damages were being examined but not detailed.
Nov. 18, 1975 Machinery Damage	At Sea	On voyage from Sluiskil, Belgium, to Donaldsonville, LA, put in Brest, France, for overnight with engine trouble. No details of problem.
March 27, 1977 Scavenge Fire	At Sea	On voyage from Wilmington, North Carolina to London, put in St. Michael's, Azores, with main engine trouble due to scavenge fire in No. 4 cylinder. Liner fractured in two in way fuel oil port, piston badly scored, etc. Left Azores 8 days later for Lisbon for further repairs of 16 days.
Oct. 23, 1977 Machinery Damage	At Sea	Main engine No. 3 cylinder liner fractured and piston skirt scuffed and cracked due to overheating of piston due cooling water failure. Repairs made in November in Venice.

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
JOSEPH P. GRACE cont'd.						
March 17, 1978 Engine Damage	At Sea	Sailed March 7, from Santos, Brazil for Trinidad. Reported due Trinidad with engine damage discovered at sea. Vessel arrived on March 17; no other details provided.				
JOULE		11,200	British	Houlder Bros.	1965	R -51
Dec.29- Jan. 9, 1974 Heavy Weather Damages	At Sea	Encountered heavy weather and damaged upper and lower shell stringers in P. & S. Nos. 1 2, and 3 ballast tanks which fractured and adrift from frames and plating. Shell webs in way of above tanks fractured, frames sheared, bulkhead stiffeners sheared, division bulkheads fractured, insulation damaged by water and part loose, bulwark plating locally distorted and 120 main engine holding down bolts affected. Repairs made at Rotterdam in April.				
Nov. 1, 1976 Boiler Damages	At Sea	Alleged collapse of cargo heating boiler. Furnace wall reported bulged and fitted with welded inserts, 42 tubes distorted and renewed. Tube plates distorted, but repairs of plates deferred. Other repairs made at Genoa in Feb.				
JULES VERNE		25,500	French	Gazocean Armement	1965	I -162
Nov. 26, 1967 Machinery Damages	At Sea	Left Havre for Arzew, Algeria but returned 2 days later with engine damage. Remained overnight and then departed again for Arzew.				
Feb. 16, 1972 Machinery Damage	At Sea	Sustained turbine damage off Cherbourg, France, shortly after leaving Havre and had to put back to Havre for repairs. Remained in port for 11 days and then set sail for Arzew.				

(Casualties cont'd next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
JULES VERNE cont'd						
Dec. 1974 Leaking Cargo Tanks	?	At Havre for three and half months for repairs to tanks which were leaking. No information on cause or extent of damages to cargo tanks.				
Dec. 28, 1974 Machinery Damage	At Sea	Some hours after sailing for Arzew, after 3-1/2 months repairing at Havre, (see above) engine breakdown occured and vessel put back to Havre for overnight repairs. No details of trouble.				
KATRISA		18,422	Liberian	Tanker Trading Inc.	1968	R -51
June 24, 1974 Hit Buoy	In Port	As Roland, sustained damage to propeller due to contact with buoy when leaving Quintero Bay, Chile, to ride out stormy weather. No other details.				
KHANNUR		126,360	Liberian	Gotaas-Larsen	1977	I -162
August 14, 1978 Collision	At Sea	Reported to have been in collision with motor vessel Hong Hwa in the Strait of Singapore. Other vessel reported at Singapore discharging cargo and effecting repairs. No damages, if any, reported for Khannur.				
LAVOISIER LPG/Solvents		5,230	Argentina	Navigas S.A.C.I.M.	1962	S -5
March 23, 1967 Butane Leak	In Port	As Lavoisier, French Flag, while discharging at Bordeaux, France, butane gas oozed out while being discharged into a dockside storage tank. Officials said a fracture in a safety valve may have caused the leak. Firemen dispersed hundreds of tons of butane gas which leaked into the harbor. Authorities, fearing an explosion, clapped down strict security precautions as firemen attempted to stop the hugewhite gas cloud drifting over the city. Vessel had loaded 3,000 tons of butane at Argentina.				
June 9, 1975 Contact Damage	In Port	As Lavoisier, Argentina Flag, while lightening liquefied gas carrier GAZANA at Buenos Aires, reported contact with other vessel. Both gas carriers reported sustaining some damage but no details provided.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
LINCOLNSHIRE	31,290	British	Bibby Line Ltd.	1972	R -50
June -, 1972 ? Deck Line Distorted	At Cape Town repaired cargo liquid line on deck, of which bellows-type expansion pieces distorted, misaligning the main pipeline itself and the T-piece connection to No. 3 tank hatch and also a second bellows joint in main liquid line to No. 2 buckled, with pipeline set down slightly. Vessel left Cape Town 5 days after arrival.				
Oct. 10, 1975 ? Insulation Impaired Due leak	Leakage from No. 2 double bottom ballast tank seriously impaired effectiveness tank top insulation in containment space. Cut shell plating and removed about 7,000 cubic feet of insulation. Cause of leakage not stated. Work was performed at Malta.				
Feb. 24, 1976 At Sea Insulation impaired due Leaks	Found, on ballast passage fromHouston to Maracaibo, leakage of water into No. 3 hole containment space and also into No. 2 spaces. Insulation in both cases destroyed and required renewal over about 2,155 square meters. Repairs were carried out at Durban in April 1977.				
June 13, 1977 At Sea Contact while Lightening	While lightening LNG CHALLENGER 40 miles off Bahrain contacted the vessel which was at anchor, while manoeuvering to come alongside. Other gas carrier was damaged affecting about 2 tons of steel weight. Apparently no damage to Lincolnshire.				
Nov. 7, 1977 At Sea Cargo Compressor Damage	Vessel put in Wellington, N.A. due damage to port, centre and starboard Freon cargo compressors running gear and to the lubricating and Freon systems by contamination. At Wellington spares and two staff members from local repairs firm embarked to assist with repairs on passage to Westernport, Australia.				
April 18, 1978 At Sea Generator damage	Enroute Coatzacoalcos, Mexico, for Mersin, Turkey, anchored off Malta for survey of generator damage. While ship's staff were assembling and positioning rotor in stator, rotor hit and damaged bottom cutside coils of stator. Approximately 8 coils were distorted and flattened and wedges broken.				
May 8, 1978 In Port Cargo Pumps failed	At Cartagena, Spain, reported cargo pumps of Nos. 1 and 3 tanks defective condition. Apparently vessel transhipped cargo of anhydrous ammonia from Nos. 1 and 3 tanks to No. 2 tank, from where cargo was discharged. Repairs to cargo pumps to be carried out enroute to Dubai.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: Temp. C
LINCOLNSHIRE cont'd					
Aug/Sept. 1978 Insulation Damage	?		Alleged due water and moisture penetration, time and place not defined but probably during months shown, Nos. 1 and 2 tank bottom glass-fibre insulation variously water-soaked and/or affected by moisture and part torn and vapour seal barrier sheathing torn in places and boding strips mostly detached. About 5-10% insulation each tank bottom to renew each tank about 1,000 sq m and vapour barrier to renew each tank. No. 3 tank bottom insulation varously torn, sagged, water-soaked or moisture affected also. All bottom insulation previously renewed Cape Town May 1976.		
August 29, 1978 Ballast-water contamination	At Sea		En route Santos, Brazil, for Trinidad, due perforation in ballast line, fuel oil from forward deep tank contaminated ballast water in forepeak tank. Ballast line holed and forepeak tank heavily contaminated with fuel oil.		
September 6,1979 Contact damage lightening	In Port		At Zone A, River Plate Estuary, Argentina, while approaching m lpg tank ATLANTE for lightening cargo, contacted other vessel. Both vessels sustained damages. No other details.		
Dec. 2-3, 1979 Cargo manifold fractured	In Port		While discharging cargo mixture of propane and butane at Houston, Texas an automatic valve of the shore installation was shut by mistake, resulting in a build-up of pressure in the discharge lines, fracturing No. 3 cargo tank manifold and emergency pump discharge pipe of No. 1 cargo tank manifold. Next day, the cargo chicsan of the shore installation fractured and fell on top of the guardrails on main deck. Owner alleged damage due to same casualty.		
LNG CAPRICORN		125,000	American	Liqui-Gas Transport (Wilmington Trust Co.) 1978	I-165
April 1979 Cargo compressor explosion	?		Survey requested in respect of cargo compressor explosion on arrival at Nagoya, Japan. No other details.		
Sept. 7, 1979 Tug contact.	In Port		Tug contact, apparently at Arun, damaged bulbous bow. Survey conducted at Himejj, Japan. no other details.		

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: Temp. C
LNG GEMINI	125,000	American	Patriot I Shipping Corp.	1978	I -165
January 1979 In Port Contamination of tanks,pumps,lines, etc.	Vessel docking at shipyard at Singapore reported contamination of cargo tanks, pipelines, pumps, etc. at last loading port. No other details.				
LORD KELVIN	31,000	British	Ocean Gas Transport Ltd.	1978	R -48
Oct. 29, 1978 In Port	While anchored in Great Bitter Lake, Suez Canal, with pilot aboard, was struck by another vessel that dragged her anchors. Accommodation ladder & davit arm extensively damaged and slight indent in hull				
LUIGI CASALE	14,268	Italian	"CARBOCOKE" Societa di Navigazione S.p.A.	1967	R -48
June 2, 1967 In Port Hit Jetty	As Capella, Swedish Flag, struck jetty while berthing in Port Hedland, Australia. No damage to ship but minor damage to jetty.				
M.P. GRACE	19,314	Liberian	Marine Transport Lines Inc.	1967	R -54
Sept. 1968 At Sea Heavy Weather damages.	At Chaguaramas, Trinidad owners reported vessel had heavy weather damages. No details of damages provided.				
Feb. 26, 1969 ?	Vessel was drydocked at Frederikshavn, Denmark, after grounding at unstated location. Vessel's bottom severely indented between bilge keels both sides at various plates from fore to aft with damage below rudder bottom bearing and set plates were renewed.				
Dec. 1972/Jan.73 At Sea Weather Damages	Bottom plating in way of forepeak and No. 1 double bottom tanks port and starboard buckled due to encountering heavy weather.				
Jan. 20, 1973 In Port Crane damage	Engine-room crane hoisting gear smashed beyond repair while at Ponta Delgada, Azores.				

(Casualties cont'd next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: Temp. C
M.P. GRACE cont'd.						
July 14, 1975 Collision	At. Sea	Was in collision with small cargo ship lat. 58 42N, long 03 03W north-east of Stroma Island. Some damage to side of gas carrier but proceeded on voyage to United States. Cargo ship went astern and proceeded. Damage to her bow but she did not require assistance.				
Aug. 4, 1978	?	Put in Durban, S.Africa, enroute Maputo for Persian Gulf for repairs of boiler tube damage. Composite auxiliary boiler lost water and overheated oil-fired tubes, resulting in heavy water leakage. Attempted temporary repairs at anchor by crew unsuccessful. Permanent repairs effected in that 2,000 oil-fired tubes renewed at Durban.				
MARINE EAGLE		11,010	American	Marine Transport Lines Inc.	1944 Converted: 1969	R
April 30, 1969 Line in Propeller	In Port	Mooring line fouled the propeller while docking at DuPont Terminal, Gibbstown, New Jersey, on voyage from Beaumont, Texas. In July at New York the spare propeller was installed and the fairwater cone renewed and one 7 inch Dacron mooring line renewed.				
July 3, 1969 Steering Gear Damage	In Port	While testing the steering gear prior to departure from Newport News, Virginia, damage was sustained due to crew negligence. It was necessary to renew two auxiliary hydraulic cylinders, rams, tie rod and steering tiller shoe, etc.				
March 10, 1970 Hit Dock	In Port	Struck the dock at Carteret, New Jersey while docking and sustained damages to shell. Two shell plates were part renewed and affected internals repaired.				
Aug. 29, 1973 Generator Damage	In Port	While departing from Beaumont enroute at Gibbstown, New Jersey, main generator damaged due tube failure in the air-cooler system. Repairs were completed at Galveston in September.				
April 4,1977 Stranded in River	In Port	Ran aground 30 miles south of Philadelphia in Delaware River, bound for Gibbsboro. Refloated 8 hours later. No report of damages, if any. Sailed later the same day for Bayonne.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: Temp. C
METHANE PRINCESS		27,400	British	Shell Tankers (U.K.) LTD.	1964	1- 162
Aug. 20, 1966 Fire in Repair Yard	In Port	While lying at Tilbury Repair Jetty, London, small fire started on bottom floor by after cofferdam in ballast tank. Solvent on fire, probably caused by welders' torches. Fire extinguished by ship's staff in 1/2 hour. No damage sustained by the vessel, but welding and electric cables used by repairers damaged.				
Feb. 10, 1967 Collision in River	In Port	Was in collision with hopper barge near Sea Reach No.4 Buoy, Thames Estuary and then aground. Hole in forepeak above water. Vessel was on voyage from Canvey Island, U.K. to North Africa, in ballast. Refloated about 2 hours later and proceeded to anchorage, and then to repair berth at Tilbury Repair Jetty. Next day the gas carrier sailed for Arzew, Algiers.				
METHANE PROGRESS		27,400	British	Shell Tankers (U.K.) Ltd.	1964	I -162
Feb. 11, 1970 Stranding in River	In Port	Stranded in Thames River inbound from Arzew, Algiers. Vessel refloated about 2 hours later without assistance. Believed no damage incurred. Vessel discharged and sailed two days later for Arzew.				
July 19, 1971 Boiler Trouble	At Sea	Returned to London, Tilbury Repair Jetty, after departing two days earlier for Arzew, with boiler trouble. One week later sailed again for Arzew.				
Oct. 9, 1973 Hit Dock	In Port	While entering the lock at Tilbury, London, as a "dead ship" and being towed by tugs, hit against the lower pierhead causing damage to the pierhead and the vessel's bow. Repairs to be completed in drydock.				
April 19, 1974 Hit Bottom	In Port	Touched bottom at Arzew, Algiers and damaged bottom and rudder. Vessel was towed to Barcelona for gas-freeing and inerting tanks prior proceeding Palermo, Sicily, for repairs. Repairs were completed in 53 days.				
Dec. 6, 1974 Hit While Moored	In Port	While moored at London, hit by motor vessel TOWER PRINCESS which proceeding inward. Gas carrier sustained a three foot hole in the steering flat 10 ft. above the water line. The other vessel sustained buckled bulwarks and mast. Gas carrier sailed 2 days later for Arzew.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
METHANE PROGRESS cont'd.						
August 1978 Cargo tank damage	In Port	No. 3 cargo tank damaged in August 1978 was repaired St.Nazaire, France, in June 1979. Repairs expected to take 20 days being effected by repairers from Hamburg who supplied the aluminium, assisted by the local shipyard.				
July 19, 1979 Fire in insulation while in shipyard	In Port	A fire started within insulating material between aft bulkhead of No. 3 hold and cofferdam while under repairs at St. Nazaire, France. No apparent damage inside No. 3 cargo tank. Fire damage repairs completed August 10.				
MONOMER VENTURE		5,748	Panamanian	Mundogas (Storage) Inc. Rebuilt:	1945 1962	R -45
Jul. 26, 1964	?	As Esso Centro America, Panamanian flag, enroute Puntarenas for Aruba, in ballast, arrived Cristobal, R.P. for minor repairs to No. 5 cylinder. Sailed 6 days later for Aruba.				
Feb. 6, 1965	?	As Esso Centro America, Panamanian flag, enroute Puntarenas for Aruba, in ballast, arrived Cristobal, R.P. and undergoing repairs to auxiliary motor generator. Left for Cartagena, Col. 5 days later.				
July 21, 1972 Contact Damage	In Port ?	As Monomer Venture, and apparently used only as a storage vessel, was reported sustaining contact (report calls it collision) damage at Heroya, Norway due to contact with Danish motor vessel Watchet Star. Five shell plates were badly set in and holed in two places and internals twisted. Permanent repairs were deferred until vessel resumes trading.				
Jan.11, 1976 Explosion in Cargo Control Room	?	Apparently after vessel loaded at Maracaibo, an explosion in the cargo pump control room damaged all control gear and the control room and the chief engineer was hurt badly. It may have happened at the dock. Vessel put into Punta Cardon, Venezuela where repairs were completed in 15 days. Permanent repairs were made at Savannah in October.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
MOSTAFA BEN BOULAID	125,260	Algerian	Algerienne, Cie., Nationale	1976	1 -160 R - 45
Dec. 1-2, 1976 In Port Broke Moorings in Gale	During strong gale the gas vessel broke her moorings at Marseilles and struck motor vessels Ferguelen and Sun Akes. Vessel reported to be at yard for repairs with empty tanks.				
April 20, 1977 In Port Touched Ground	While underway to lay-up near Haugesund, Norway, touched ground at Bovagen, but was refloated and berthed by local tugs. Limited bottom damages will probably be repaired when docking in Autmn of 1978.				
April 8, 1979 In Port LNG spill fractured deck	At Maryland vessel had LNG spill. Deck fractured and possible cargo tank damage. Vessel repaired at La Ciotat, France, for about one month.				
MUNDOGAS AMERICA	52,647	British	Mundogas	1972	R -48
March 1, 1973 At Sea Boiler Damage	As Garmula, British flag, arrived Cape Town with fractured boiler apparent cause faulty welding from undercut at top of fillet. Fracture also located in one feed circulating tube in way of lamination at top. Vessel sailed 2 days later.				
May 7, 1973 ? Machinery Trouble	As Garmula, British flag, enroute La Salina, Venezuela, for Japan with cargo of propane, repaired at Cristobal, R.P. , for at least 6 days turbo-blower trouble.				
Aug. 24, 1973 At Sea Steering Gear Trouble	As Garmula, British flag, enroute Ras Tanura for Buenos Aires, put in Montevideo Roads overnight to effect repairs to steering gear. No other details provided.				
Sept. 27, 1974 In Port Three Killed due failure Air-circulation system	As Garmula, British flag, the captain and 2 officers suffocated to death when the air circulating system failed while they were inspecting the bilges, at Santos, Brazil. The accident occured as 15,000 tons of liquid gas was being discharged. Two Pakistani crew members managed to escape through a narrow bilge duct. The air-circulating system failed while the five men were on a routine inspection.				

(Casualties cont'd on next page)

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
MUNDOGAS AMERICA cont'd.						
March 9, 1974 Machinery Damage	?	As Garmula, British flag, an auxiliary engine lubricating oil failure resulted in crankshaft bent and condemned. Two connecting rods scored in crankpin bearing housing. repairs to be completed at sea upon receipt of a new crankshaft.				
June 16, 1976 Grounding	In Port	As Garmula, British flag, grounded at unstated location and outer stern tube seals leaking and stern tube oil system contaminated with sea water and repaired at Schiedam, Netherlands in October.				
Dec. 29-31, 1976 Weather Damages	At Sea	As Garmula, British flag, alleged heavy weather resulted in damage to high wing ballast, tank bulkheads, double bottom fuel/ballast tank bulkheads and internals in way claimed severally fractured and ammonia tank insulation variously soaked/water damaged. Eight cargo pumps were later found out of order, and further structural cracking revealed.				
Jan. 10, 1977 Weather Damages	In Port	As Garmula, British flag, in Boston Roads, Mass., heavy weather caused damage to anchor stopper and fractured also, anchor flukes and chain affected. Repairs to be carried out later in the year.				
May 28, 1979 Lost port anchor in heavy weather	At Sea	As Garmula, British flag, enroute Ras Tanura, S.A. to River Plate, Argentina during heavy weather in South Atlantic lost port anchor due breakage of connecting link.				
MUNDOGAS EUROPE		22,246	Norwegian	Mundogas	1968	R -48
Jan. 8, 1969 Steering Gear Problem	At Sea	As Kristian Birkeland, Norwegian flag, put in Bermuda, enroute U.K. to Beaumont, Texas, with steering gear problem. Departed next day, No details of problem.				
March 14, 1970 Touched Ground	At Sea	As Kristian Birkeland, Norwegian flag, while on voyage up fjord to Heroya, Norway, from Lake Charles, Louisiana, touched ground, Vessel left Porsgrunn 3 days later for Sandefjord for docking. No other details provided.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
MUNDOGAS PACIFIC	21,795	Norwegian	Norwegian Gas Shipping Ltd.	1969	R -48
Jan. 11, 1978 In Port Cargo Heater Failure	As Fernwood, Norwegian flag, arrived Salvador, Brazil to discharge 1,500 tons of ammonia to storage vessel Mundogas Norte, anchored off Aratu port, had cargo heater failure and unable to effect discharge. 540 heater tubes require replacement. Order to proceed to Trinidad for repairs.				
Dec. 29, 1978 At Sea Engine-room explosion fire	As Fernwood, Norwegian Flag, enroute Nikiski for Avonmouth, U.K., via Panama Canal had an engine room explosion. Vessel fully loaded with ammonia, had a blackout. Subsequently, main engine stopped and vessel towed to Balbao, Panama. Apparently No. 2 auxiliary generator circuit-breaker on main switchboard short-circuited and consequently fire occured in No. 2 cubicle of switchboard.				
March 6, 1979 ? Cargo gas-freeing fan blower damaged	At St.Nazaire, France, survey requested respect cargo blower trouble. Damage on port side cargo gas-freeing fan blower. Complete rotating element, including fan impeller shaft, bearing housings and couplings to be renewed, and shaft seal assembly, etc.				
July 22, 1979 At Sea Multiple Diesel generator failures	Put in Djibouti as port of refuge on August 20, with multiple diesel generator failures. First failure occured enroute Augusta for Ras Tanura to No. 2 diesel generator. Piston, liner and connecting rod broken, etc. Second failure occured August 16, and repairs to No. 2 generator had not been completed, therefore, diversion to Djibouti. No. 3 generator crankshaft damaged. Nos. 1,3,6,7 and 8 crankpins heavily scored and Nos. 2,4, and 5 lightly scored. Permanent repairs in hand by travelling repair party.				
MUNDOGAS RIO	19,462	Norwegian	Olvind Lorentzen	1967	R -42
Oct. 24, 1967 At Sea Machinery Overhaul	Enroute Flushing,Netherlands to Puerto la Cruz, Venezuela, put in Horta, Azores, for a few hours for a cylinder overhaul. No other details.				
May, 1973 At Sea Machinery Damages	During the voyage from Buenos Aires to Ras Tanura there were many stops at sea due mainly to piston cooling water jackets leaking. The main engine lubricating oil was found to be contaminated with fresh water. On May 13, the vessel put into Durban, S.A. for repairs and stores. On the return trip from Ras Tanura to Durban there were additional repairs required to the main engine. Also the exhaust gas boiler tubes were found blocked with a hard deposit due to contamination of the feed water due to a leaking fuel oil heater.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
NORMAN LADY	87,600	British	Buries Marks Ltd./Leif Hoegh	1973	I -163 R -45
Sept. 7, 1973 In Port New Building; Boiler damage	Two months before delivery in the builder's yard at Stavanger, Norway, there was an explosion in the boiler and damage was sustained. No other details provided.				
NORTHERN EAGLE I	75,650	Liberian	Northern Eagle Inc.	1978	R -48
Jan. 1, 1979 ? Generator damages	Survey requested at Holmerstrand, Norway in respect to damage to Nos. 1 and 3 generators. No other details.				
NYHAVN	19,450	Norwegian	Chr. Haaland	1968	R -47
Nov. 19, 1975 At Sea Holes & Hull Cracks	After crossing the Gulf of Alaska sustained damage and put in Homer, Alaska. Several small holes and crack in double bottom fuel tank on port side and cracks in sea chest. Vessel returning to Victoria, B.C., for repairs. The vessel was on a voyage from Guaymas, Mexico to Nikiski, Alaska. 5 days were spent at Victoria and sailed for USA.				
OGDEN BRIDGESTONE	74,580	Panamanian	Ogden Orinoco Transport Inc.	1973	R -46
Dec. 7, 1976 At Sea Machinery Damage	Enroute Bandar Mahshahr, Iran, for Japan with cargo, sustained machinery damage. Put into Singapore overnight for repairs and then continued voyage to Japan. No details of damages.				
Sept. 20, 1977 At Sea Machinery Damage	Enroute Bandar Mahshahr, Iran, for Japan reported main engine damage after leaving loading port. Apparently, put into Mena al Ahmadi overnight for repairs. No details provided.				
September 1979 ? Stern gland leakage	While drydocking at Sakaide, Japan, surveyed stern gland leakage. No other details.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
PASCAL		15,022	French	Cie. Generale Maritime	1976	S -48
Nov. 3, 1978 Collision	In Port	Collision in Houston, Texas with motor vessel Jela Topic. Both vessels grounded following collision. Pascal was refloated with tug assistance. Port side shell plating, deck plating, bulwarks and intenal members in way of No. 3 port void compartment and machinery spaces damaged. No leakage as a result of grounding. Understand vessel sailed same day for U.K.				
PERMIAN GAS		9,000	Liberian	Global Gas Transport Inc.	1968	S -48
June 26, 1970 Contact, No Damage	In Port	As Cap D'Antibes, French Flag, contact with motor vessel Acolos, at Convent, Louisiana. Assume the gas carrier anchored or moored at time of contact, but report not clear on this point. Some damage to shell on Acolos, but no mention of any damage to Cap D'Antibes.				
March 18, 1975 Grounding	In Port	As Cap D'Antibes, French flag, loaded with gas, grounded at Zueitina, Libya, in lat. 30 54N, long 20 05E. Understand trying to transfer cargo to another vessel. Refloated and sailed for Piraeus 13 days later. No report of damage.				
PETRON GASUL		28,875	Philippine	Phil.Nat.Oil. Co.	1962	R -41
Jan. 6, 1972 Shaft damage	?	As Bridgestone Multina, Liberian flag, Agents requested survey of stern shaft damage At Singapore. Vessel spent 2 days at Singapore and left for Japan. No other details provided.				
June 30, 1977 Hit dock	In Port	As Bridgestone Multina, Liberian Flag, while attempting to berth at Melbourne, Australia, vessel struck jetty due to excessive strong winds. Damage indentation shell plating and hole in bow area. Damage also sustained by wharf and deck structure of attending tug Henry Bolte. Left for Japan 12 days later. No other details				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METER	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
PIONEER LOUISE	77,500	Liberian	Sanko Steamship Co.	1976	R
Jan. 21, 1977 At Sea Propeller Damage	Enroute Bandar Mahshahr, Iran, for Chiba and Wakayama, Japan, damaged propeller and drifted off Hamamatsu. Thee days later arrived in tow at Wakayama and sailed the next day in tow for Yokohama for repairs. Sailed from repair yard 10 days later for Persian Gulf. No indication of type of damage to propeller or cause.				
POLAR ALASKA	71500	Liberian	Polar L.N.G. Shipping Corp.	1969	I -162
Nov. 19, 1969 In Port Gas Leakage; Invar Strakes Creased	Gas leakage at time of loading in Alaska, No. 1 cargo tank barrier detected. Various damage to mineral insulated cables to pump motors, nitrogen bubbler tubes, barrier punch nitrogen feed line, etc. No. 1 cargo tank primary barrier invar strakes creased at numerous locations. Cause of casualties not stated, if known.				
May 6, 1970 ? Propeller,Shaft damage	Examination in drydock at Yokohama revealed damage to propeller, tailshaft, ropeguard and stern tube oil seal, cause unknown.				
Feb. 24, 1973 ? Cracks in Deck plates	At Kobe, Japan, found fractures in upper deck plating about 5 or 6 in way of No. 1 tank, varying in length between 3 meters and 800 mm. also in way of No. 3 tank access thatch approximately 14 or 15 fractures of 800-900 mm. in length. Void space internals of No. 4 tank also found fractured. It appears heating lines for spaces affected were omitted during construction and this was with ambient temperature in Alaska of minus 40 deg. Centigrade may have contributed to casualty.				
Dec. 20, 1976 ? Tank leakage	While loading at Kenai, Alaska found leakage No. 5 tank, cause unknown. Liquid leakage to primary barrier and vapour leakage to secondary barrier. US Coast Guard permitted vessel to sail for Yokohama with No. 5 tank, primary and secondary barriers inerted with CO2, and tanks No. 1 to No. 4 and 6 loaded.				
August 20, 1978 In Port Hit dock	Made hard contact with Phillips loading pier at Kenai, Alaska. Damages under investigation. Vessel re-docked next day. No further data provided.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: temp. C
POLLENGER	87,600	British	P.& O. Bulk Shipping Div.	1974	I -163 R - 45
June 7, 1977 At Sea Contact Damage	As LNG CHALLENGER, British Flag, while in laden condition, lying at anchor about 40 miles off Bahrain, was contacted by LINCOLNSHIRE which manoeuvering alongside to load cargo from the LNG CHALLENGER. Shell plating indented and holed in two locations in way of engine room stores. Frames slightly distorted. Vessel was carrying LPG at time of casualty.				
August 26, 1978 ? Contacted by floating crane	As LNG CHALLENGER, British Flag, contacted by floating crane MAGNUS IX, while apparently at anchor off Bahrain. Sustained two holes and big dent on port side. Port anchor flukes driven into shell. Hull indents in fuel oil tank.				
April 25, 1979 In Port Cargo drip fractured steel tank cover	While discharging LNG at Boston, Mass., cargo dripped onto cover from leaking gland of eductor drive valve on top of No. 1 dome causing fracture in No 1 steel plate tank cover between cover girders. On May 8 put into Gibraltar to temperarily repair damage including fitting a doubling plate 6.5' by 10.5' over affected areas.				
Nov. 11, 1979 In Port Lost anchor & chain	When anchoring at Gibraltar, lost starboard anchor and 13 lengths of chain. Anchor recovered several days later and returned to vessel on subsequent call Nov. 20.				
PUERTO RICAN (LPG/CHEMICAL)	12,320	American	Hendy International Co.	1971	R -14
May 13, 1976 In Port Tug contact	While docking with tug assistance at New Orleans, LA, the tug collided with the gas carrier, which sustained a hole in the starboard bow. Repairs included part renewal of two side shell plates and fairing of three plates. Repairs were deferred.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
PYTHAGORE	14,258	Panamanian	Antarctic Gas Inc.	1967	R -48
March 17-19, 1971 At Sea Weather Damages	As ARQUIMEDES, Panamanian Flag, encountered heavy weather on voyage from Rotterdam to Buenos Aires, loaded with butane gas. Deck ventilators leading to forward storerooms were broken and the storeroom flooded causing damage to the equipment and electrical circuits.				
Nov. , 1972 In Port Grounding	As ARQUIMEDES, Panamanian Flag, grounded in a Chilean port and subsequently put into San Juan, Puerto Rico with engine trouble that was apparently related to the grounding. Two months after the grounding the vessel was drydocked in Havre, France. No details of grounding and/or engine damages were provided.				
Aug. 11, 1976 In Port Hit Dock Wall	As PYTHAGORE, contacted drydock wall at St.Nazaire, France. Starboard quarter plating was set in 3 places and 2 frames and 1 web frame bent, in engine room. Repairs were deferred.				
June 22, 1978 At Sea Heavy Weather Damages	As PYTHAGORE, reported drydocked at St.Nazaire, France, Sept. 18, with heavy weather damages sustained in June. Forecastle bulwark plating indented over 5 meters and bilge keel to renew over 6 meters. Main engine forward turbo-charger casing cracked over 30 cm. Noted leak of circulation water.				
RYE GAS	13,196	Liberian	Crystal Steamship Co.	1963	S -5
Dec. 4, 1976 At Sea Weather Damage	As Crystal, Liberian Flag, Teea for US, loaded, sustained heavy weather and came to Brest Roads, France, as port of refuge for repairs. Left Brest 17 days later for Havre, to transship cargo to another gas carrier, Fernbank. The Crystal sailed for Havre 45 days later. No details of damages.				
SANT JORDI	5,000	Spanish	Nav. de Productos Licuados S.A.	1977	I -165
January 8, 1980 In Port Collision, light damage	In collision Flushing Roads, Netherlands, with tanker Gerol Kerchi. Light damages sustained by Sant Jordi. No other details.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE TEMP. C
TATSUNO MARU	50,670	Japanese	Nippin Yusen Kaisha	167	R -45
Aug. 6, 1971 In Port Fire in Shipyard, 5 dead.	During annual drydocking at Yokohama, a fire broke out in No. 4 tank due to welding and lasted about one hour. Five dockyard employees were killed. No mention of any damage to the vessel				
TOYOSU (LPG/OIL)	13,145	Japanese	Tokyo Ekikagasu Yososen Kaisha, Ltd. Rebuilt:	1945 1963	R -47
Nov. 29, 1966 At Sea Lost Propeller Blade	Enroute Tokyo for Bombay, when approximately 300 miles off Bombay, severe bump and vibration felt, which necessitated slowing down. One blade of propeller missing, probably due striking sunken country craft or drifting logs as a result of severe cyclonic storm on west coast of India at end of November. Surveyor found one blade sheared off 6 in. from boss probably due to flaw or small previous fracture.				
VASCO DE GAMA	6,100	Norwegian	A.I. Langfeldts Rederi	1976	S -104
Feb. 26, 1979 In Port Collision	Collided with GAROUFALIA in Flushing Roads, Netherlands, while in ballast with about 12 tons ethylene gas remaining in all four tanks. Dense fog at time of collison. Both anchored for inspection of damage. Other vessel sustained heavy damage on forepeak. Gas carrier port side plating heavily torn open over 6 meters extending below water level in way of No. 3 hold space. No. 3 space open to sea and flooded. Diesel tank open and 60 tons of diesel lost.				
July 19, 1979 At Sea Breakdown due electrical failure	While enroute Tarragona, Spain, to Terneuzen, Netherlands, had engine trouble due to electricity failure about 10-20 miles off the Minquiers Islands in English Channel. Vessel in ballast. Tug attended and put compressor aboard to start engine. Drifted for 16 hours without power then resumed voyage.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME	CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
WILLIAM R. GRACE	12,975	Liberian	Marine Transport Lines Inc.	1964	R -45
June 20, 1965 In Port Grounded at Berth	Grounded alongside the berth at Guanica, Puerto Rico, sustaining bottom damages. Three bottom plates were renewed, five plates were part renewed and 2 plates required fairing in place plus straightening of affected internals.				
May 27, 1970 At Sea Weather Damage	Vessel reported minor damage to port lifeboat and one davit. The damage was repaired at Port of Spain, Trinidad. Damage was probably due to weather.				
Jan. 20, 1971 At Sea Explosion Main Engine	Enroute Shell Haven, London to Trinidad, in ballast, an explosion in the main engine damaged the exhaust trunking and scavenge coolers. Repairs were made at Trinidad.				
June 4, 1970 ? Touched Bottom	Vessel reported touching bottom but location of incident not stated. In October of 1971 the vessel was surveyed in drydock at Frederikshavn, Denmark, but no damage was found due to touching bottom.				
March 11-13, 1973, At Sea Weather damages	Enroute River Thames, U.K. to Aruba, N.A., encountered heavy weather and sustained some damage. Jacksonville, Fla.- in May of 1973, the vessel was surveyed for the damages. No details were provided of the damages, if any.				
Dec. 21, 1977 At Sea Weather Damages	At Port of Spain, Trinidad, vessel reported davit damage due heavy weather. No other details provided.				
January 3, 1978 In Port Machinery Damage	At Trinidad reported machinery damage. No other details provided.				
March 16, 1979 In Port Lost power & steering and grounded in Seine	While departing Rouen, France, in ballast, with pilot aboard, vessel blacked out and lost steering in River Seine. Shortly after, grounded on stern. Power was restored and the vessel refloated by means of her anchors and proceeded Havre for inspection. Rudder stock was twisted to starboard about 20 degrees. Proceeded to Rotterdam with tug escort for repairs. Vessel was stranded for less than 2 hours.				

REPORTED CASUALTIES TO LIQUEFIED GAS CARRIERS ABOVE 5000 CBM

VESSEL NAME		CUBIC METERS	FLAG	OWNERS	YEAR BUILT	TANK TYPE: TEMP. C
WILTSHIRE		15,495	British	Bibby Bros. & Co.	1968	R -50
Feb., 1972 Weather Damages	At Sea	Enroute Cobh, Ireland, for United States, encountered heavy weather and put into St.Michaels, Azores, for overnight. At Donaldsonville, LA, divers reported a fracture in the bottom plating.				
May 1979 Hit submerged object and lost propeller blade	At Sea	Enroute Falmouth, England, for Brazil, contacted a submerged object and lost propeller blade. Put in Ferrol, Spain, for repairs and departed 32 days later.				
WORLD BRIDGESTONE		74,442	Panamanian	Credo Shipping Co. S.A.I.	1971	R -46
March 28, 1973 Collision	At Sea	Enroute Mena al Ahmadi, Kuwait to Japan, loaded with LPG, was in collison with tanker MARYLAND TRADER at North end of Malacca Strait. The gas carrier rustained a crack in the shell plating port side No. 1 and damage way No. 5 hold. Both affected tanks were loaded with butane. The other tanks in the gas carrier were full of liquid propane. Weather deck plating severely damaged above No. hold fuel bunker tank. Void space in No. 1 hold around cargo tank flooded after collision due fractured shell plating below water line. Both vessels put in Singapore for temporary repairs. Gas carrier left Singapore after temporary repairs were completed and proceeded to Japan for discharge and permanent repairs.				
YUYO MARU NO. 10 (LPG/OIL)		47,424	Japanese	Yuyo Kaiun, K.K.	1966	R -46
Nov. 9, 1974 Collision; TOTAL LOSS	In Port	Enroute Ras Tanura, Saudi Arabia for Kawasaki, Japan, with a cargo of propane, butane and naphtha, collided with motor bulk carrier PACIFIC ARES off Yokohama harbor, both on fire. A huge explosion ripped through the hull of the gas carrier about three hours after collision. 15 firefighting and rescue vessels had been warned to stay away from the gas carrier for fear of an explosion. 29 seamen from the bulk carrier and 5 from the gas carrier were confirmed dead. Later in the day the gas carrier was towed by two tugs and run aground off Futtsu Point, where she continued burning. The gas carrier continued burning for a week. 19 days after the collision, still afire, the gas carrier was towed 300 miles east of Tokyo and sunk by Japanese Armed Forces.The master of both vessels were charged with suspicion of causing unintentional manslaughter and injuries. Master of bulk carrier was killed by the incident. (The damage was found under investigation to have been caused by the naphtha fire). TOTAL LOSS.				